Test 1

Total mark 5

1 **Choose the correct answer from those given :** (3 marks)

1 The solution set of the equation : $x^2 = x$ in $\mathbb{R}$ is .....

ⓐ $\{0\}$ ⓑ $\{-1\}$ ⓒ $\{0 , 1\}$ ⓓ $\varnothing$

2 If $5^x = 7$, then 5^{x+1} = ...

ⓐ 7 ⓑ 8 ⓒ 35 ⓓ 45

3 If $(x - 5)^0 = 1$, then $x \in$ .....

ⓐ R ⓑ R – $\{5\}$ ⓒ R – $\{-5\}$ ⓓ $\{5\}$

2 **Simplify:** $\frac{4^{x+1} \times 9^{2-x}}{6^{2x}}$ (2 marks)

, then find the value of the result when $x = 1$

Test 2

Total mark 5

1 **Choose the correct answer from those given :** (3 marks)

1 The solution set of the equation : $x^2 + 4 = 0$ in $\mathbb{R}$ is .....

ⓐ $\{-4\}$ ⓑ $\{2 , -2\}$ ⓒ $\{-2\}$ ⓓ $\varnothing$

2 If $2^x = 5$, then 8^x = ...

ⓐ 5 ⓑ 15 ⓒ 25 ⓓ 125

3 If a (c + d) – b (c + d) = 20 and c + d = 4 , then a – b = ...

ⓐ 4 ⓑ 5 ⓒ 80 ⓓ 40

2 Find the positive real number which if we added its square to its three times , it becomes 28 (2 marks)

Test 3

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 If 3 is a root of the equation : $x^2 + k = 0$, then k = ...

ⓐ 3 ⓑ 9 ⓒ – 3 ⓓ – 9

2 If $3^x = 5$, $\frac{1}{3^y} = 7$, then 3^{x+y} = ...

ⓐ 35 ⓑ 12 ⓒ $\frac{7}{5}$ ⓓ $\frac{5}{7}$

3 If $7^{x+1} = 5^{1+x}$, then x = ...

ⓐ – 1 ⓑ 7 ⓒ 5 ⓓ 1

2 Find in $\mathbb{R}$ the S.S. of the following equations : (2 marks)

a $x^2 - 7x + 12 = 0$

b $2x^3 - 18x = 0$

Test 4

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 $3x^0$ = ... , $x \neq 0$

ⓐ 0 ⓑ 1 ⓒ 3 ⓓ $3x$

2 The S.S. of the equation : $x(x - 4) = 0$ in $\mathbb{R}$ is .....

ⓐ $\{0 , 4\}$ ⓑ $\{0 , -4\}$ ⓒ $\{0 , 2 , -2\}$ ⓓ $\{2 , -2\}$

3 $a x - c x - c y + a y = (x + y)$ (.....)

ⓐ $a + c$ ⓑ $a - c$ ⓒ $c - a$ ⓓ $2a + 2c$

2 Find the dimensions of a rectangle whose length is 4 cm. more than its width and whose area is 21 cm^2. (2 marks)

Test 5

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 If $7^{x} = 5$, then $7^{-x} =$ .....

ⓐ 5 ⓑ $\frac{1}{7}$ ⓒ $\frac{1}{5}$ ⓓ 35

2 Quarter of 2^{16} = ...

ⓐ 2^{4} ⓑ 2^{15} ⓒ 2^{14} ⓓ $\left(\frac{1}{2}\right)^{4}$

3 The solution set of the equation : $x(x-3) = 5x$ in $\mathbb{R}$ is .....

ⓐ $\{3\}$ ⓑ $\{0, 3, 5\}$ ⓒ $\{3, 5\}$ ⓓ $\{0, 8\}$

2 Simplify : $\frac{2^{2x} \times 3^{x-1}}{12^{x}}$ (2 marks)

Test 1

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 In ΔABC , $(AB)^2 = (BC)^2 + (AC)^2$, $m(\angle B) = 40°$, then $m(\angle A)$ = ...

ⓐ 50° ⓑ 70° ⓒ 100° ⓓ 80°

2 Two similar triangles , the ratio between the lengths of two corresponding sides in them is 5 : 3 , if the perimeter of the greater triangle is 60 cm. , then the perimeter of the smaller triangle is ..... cm.

ⓐ 3 ⓑ 36 ⓒ 100 ⓓ 5

3 If the area of a square is 50 $cm.^2$, then the length of its diagonal = ...

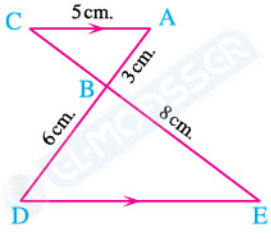
ⓐ 5 cm. ⓑ 10 cm.

ⓒ 20 cm. ⓓ 25 cm.

2 In the opposite figure : (2 marks)

$\overline{AC} // \overline{ED}$, $\overline{AD} \cap \overline{CE} = \{B\}$

, AC = 5 cm. , BE = 8 cm. , AB = 3 cm. and BD = 6 cm.



1 **Prove that :** $\Delta ABC \sim \Delta DBE$

2 **Find the length of each of :** $\overline{BC}$ and $\overline{ED}$

Test 2

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 All ..... are similar.

ⓐ triangles ⓑ squares ⓒ rhombus ⓓ rectangles

2 If the area of a trapezium is 108 cm.^{2} and the length of one of its parallel bases is 15 cm. and its height is 8 cm. , then the length of the other base is .....

ⓐ 27 cm. ⓑ 18 cm. ⓒ 15 cm. ⓓ 12 cm.

3 A rhombus whose diagonals lengths are 6 cm. , 8 cm. and its height is 4.8 cm. , then its side length is ..... cm.

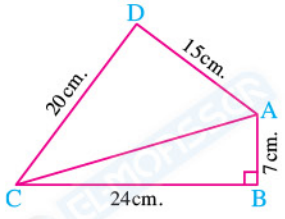
ⓐ 10 ⓑ 5 ⓒ 20 ⓓ 12

2 In the opposite figure : (2 marks)

ABCD is a quadrilateral in which :

AB = 7 cm. , AD = 15 cm. , BC = 24 cm.

, DC = 20 cm. , m (∠ B) = 90°



1 **Find :** The length of $\overline{AC}$

2 **Prove that :** m (∠ ADC) = 90°

Test 3

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 If the area of a rhombus is 30 cm.^{2} , the length of one of its diagonals is 6 cm. , then the length of the other diagonal = ...

ⓐ 5 cm. ⓑ 6 cm. ⓒ 10 cm. ⓓ 8 cm.

2 In Δ ABC if $(AB)^2 = (BC)^2 + (AC)^2$, m (∠ B) = 2 m (∠ A) , then m (∠ A) = ...

ⓐ 30° ⓑ 45° ⓒ 60° ⓓ 90°

3 If the ratio of enlargement between two similar polygons equals ..... , then the two polygons are congruent.

ⓐ 2 : 1 ⓑ 1 : 2 ⓒ 1 : 1 ⓓ 3 : 1

---

2 A trapezium whose area is 450 cm^2. If the lengths of its two parallel bases are 24 cm. and 12 cm. , then find its height. (2 marks)

Test 4

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 The trapezium in which the lengths of its two parallel bases are 7 cm. and 9 cm. , then its middle base is of length .....

ⓐ 16 ⓑ 32 ⓒ 8 ⓓ 2

2 In any two similar polygons , the lengths of their corresponding sides are .....

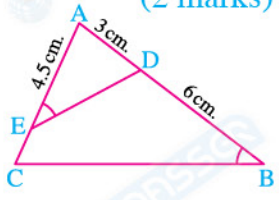
ⓐ alternate. ⓑ different.

ⓒ proportional. ⓓ equal.

3 The rhombus whose diagonals lengths are 6 cm. and 10 cm. its area = ... cm^2

ⓐ 60 ⓑ 30 ⓒ 15 ⓓ 10

2 In the opposite figure : (2 marks)



m (∠ AED) = m (∠ B) , AD = 3 cm. ,

AE = 4.5 cm. and BD = 6 cm.

1 **Prove that :** Δ ABC ~ Δ AED

2 **Find the length of :** $\overline{EC}$

Test 5

Total mark 5

1 Choose the correct answer from those given : (3 marks)

1 If $\Delta ABC \sim \Delta DEF$ and $AB = \frac{1}{3} DE$, then the perimeter of ΔABC = ... the perimeter of ΔDEF

ⓐ 3 ⓑ $\frac{1}{3}$

ⓒ 1 ⓓ $\frac{2}{3}$

2 If the perimeter of a rhombus is 24 cm. and its area is 30 cm^2 , then its height = ...

ⓐ 4 cm. ⓑ 5 cm.

ⓒ 6 cm. ⓓ 12 cm.

3 If the area of a trapezium is 24 cm^2 and its height is 4 cm. , then the length of its middle base = ...

ⓐ 6 cm. ⓑ 8 cm.

ⓒ 12 cm. ⓓ 16 cm.

2 In the opposite figure : (2 marks)

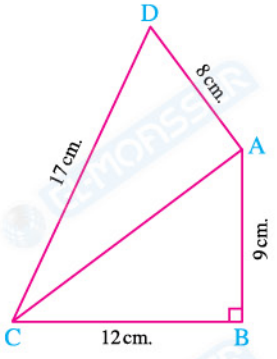
ABCD is a quadrilateral in which : m (∠ B) = 90° ,

AB = 9 cm. , BC = 12 cm. ,

CD = 17 cm. and DA = 8 cm.

Prove that : m (∠ DAC) = 90° ,

then find : The area of the figure ABCD



Answers of Test 1

1 1 (c) 2 (c) 3 (b)

2 $\frac{2^{2x+2} \times 3^{4-2x}}{2^{2x} \times 3^{2x}} = 2^{2x+2-2x} \times 3^{4-2x-2x} = 2^2 \times 3^{4-4x}$

When $x = 1$

$\therefore$ The value of the result $= 2^2 \times 3^{4-4} = 2^2 \times 3^0 = 4 \times 1 = 4$

Answers of Test 2

1 1 (d) 2 (d) 3 (b)

2 Let the number be x $\quad \therefore x^2 + 3x = 28$

$\therefore x^2 + 3x - 28 = 0$ $\quad \therefore (x-4)(x+7) = 0$

$\therefore x - 4 = 0$ $\quad \therefore x = 4$

or $x + 7 = 0$ $\quad \therefore x = -7$ (refused)

$\therefore$ The number is 4

Answers of Test 3

1 1 (d) 2 (d) 3 (a)

2 **(a)** $(x-3)(x-4) = 0$

$\therefore x - 3 = 0$ $\quad \therefore x = 3$

or $x - 4 = 0$ $\quad \therefore x = 4$

$\therefore$ The S.S. $= \{3, 4\}$

(b) $2x(x^2 - 9) = 0$ $\quad \therefore 2x(x-3)(x+3) = 0$

$\therefore 2x = 0$ $\quad \therefore x = \frac{0}{2} = 0$

or $x - 3 = 0$ $\quad \therefore x = 3$

or $x + 3 = 0$ $\quad \therefore x = -3$

$\therefore$ The S.S. $= \{0, 3, -3\}$

Answers of Test 4

1 1 (c) 2 (a) 3 (b)

2 Let the width of the rectangle be x cm.

$\therefore$ The length of the rectangle is $(x + 4)$ cm.

$\therefore x(x + 4) = 21$

$\therefore x^2 + 4x - 21 = 0$

$\therefore (x + 7)(x - 3) = 0$

$\therefore x + 7 = 0$, then $x = -7$ (refused)

or $x - 3 = 0$, then $x = 3$

$\therefore$ The width = 3 cm. and the length = 7 cm.

Answers of Test 5

1 1 (c) 2 (c) 3 (d)

2 $\frac{2^{2x} \times 3^{x-1}}{2^{2x} \times 3^{x}} = 3^{x-1-x} = 3^{-1} = \frac{1}{3}$

Answers of Test 1

1 1 (a) 2 (b) 3 (b)

2 $\because \overline{AC} // \overline{ED}$, $\overleftrightarrow{AD}$ is a transversal to them.

$\therefore$ m ($\angle$ A) = m ($\angle$ D) (alternate angles) (1)

$\because \overline{AC} // \overline{ED}$, $\overleftrightarrow{CE}$ is a transversal to them.

$\therefore$ m ($\angle$ C) = m ($\angle$ E) (alternate angles) (2)

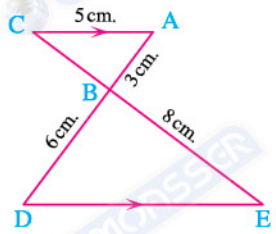
$\because$ m ($\angle$ ABC) = m ($\angle$ EBD) (V.O.A) (3)

From (1) , (2) , (3) :

$\therefore \Delta ABC \sim \Delta DBE$ (the first req.)

$\therefore \frac{AB}{DB} = \frac{BC}{BE} = \frac{CA}{ED}$ $\therefore \frac{3}{6} = \frac{BC}{8} = \frac{5}{ED}$

$\therefore$ BC = 4 cm. , DE = 10 cm. (the second req.)



Answers of Test 2

1 1 (b) 2 (d) 3 (b)

2 In Δ ABC :

$\because$ m ($\angle$ B) = 90°

$\therefore (AC)^2 = (7)^2 + (24)^2 = 49 + 576 = 625$

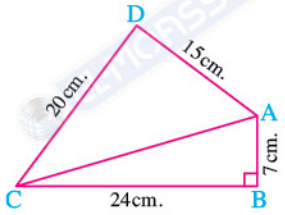
$\therefore$ AC = 25 cm. (the first req.)

In Δ DAC :

$\because (DA)^2 + (DC)^2 = (15)^2 + (20)^2 = 225 + 400 = 625$

$\therefore (DA)^2 + (DC)^2 = (AC)^2$

$\therefore$ m ($\angle$ ADC) = 90° (the second req.)



Answers of Test 3

1 1 (c) 2 (a) 3 (c)

2 The area of the trapezium = $\frac{1}{2}(\ell_1 + \ell_2) \times h$

$\therefore 450 = \frac{1}{2}(24 + 12) \times h$ $\therefore 450 = 18 \times h$ $\therefore h = 25$ cm.

Answers of Test 4

1 1 (c) 2 (c) 3 (b)

2 In Δ ABC , AED :

$\because$ m ($\angle$ B) = m ($\angle$ AED) , $\angle$ A is a common angle

$\therefore$ m ($\angle$ C) = m ($\angle$ ADE)

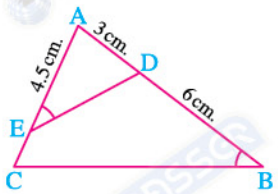
$\therefore \Delta ABC \sim \Delta AED$ (the first req.)

$\therefore \frac{AB}{AE} = \frac{AC}{AD}$

$\therefore \frac{9}{4.5} = \frac{AC}{3}$

$\therefore AC = \frac{3 \times 9}{4.5} = 6$ cm.

$\therefore EC = 6 - 4.5 = 1.5$ cm. (the second req.)



Answers of Test 5

1 1 (b) 2 (b) 3 (a)

2 In Δ ABC :

$\because$ m ($\angle$ B) = 90°

$\therefore (AC)^2 = (AB)^2 + (BC)^2 = 81 + 144 = 225$

$\therefore AC = 15$ cm.

In Δ DAC :

$\because (AC)^2 = 225$, $(AD)^2 = 64$, $(DC)^2 = 289$

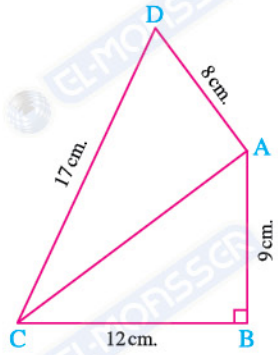
$\therefore (DC)^2 = (AD)^2 + (AC)^2$

$\therefore$ m ($\angle$ DAC) = 90° (The first req.)

$\because$ the area of the figure ABCD = (the area of Δ ABC) + (the area of Δ DAC)

$\therefore$ the area of the figure ABCD = $(\frac{1}{2} \times 9 \times 12) + (\frac{1}{2} \times 8 \times 15)$

$= 54 + 60 = 114$ cm^2 (The second req.)



Test 1

Total mark: 10

Answer the following questions :

1 Choose the correct answer from the given ones : (3 Marks)

1 The additive inverse of $\left(\sqrt{3}\right)^{-4}$ is .....

(a) $\frac{1}{9}$ (b) $-\frac{1}{9}$ (c) $\left(\sqrt{3}\right)^{4}$ (d) $\left(-\sqrt{3}\right)^{4}$

2 $5\,a^{0}$ = ... where $a \neq 0$

(a) 5 (b) 1 (c) a (d) 5 a

3 If $2^{x} = 7$, $2^{y} = 5$, then 2^{x-y} = ...

(a) 35 (b) $\frac{7}{5}$ (c) 2 (d) 12

---

2 Complete : (3 Marks)

1 If $3^{x+3} = 1$, then $2x$ = ...

2 $\left(\sqrt{7}\right)^{3} \times \left(\sqrt{7}\right)^{5} = 7^{\cdots\cdots}$

3 Four times the number 2^{8} is .....

---

3 Simplify : $\frac{4^{n} \times 6^{2n}}{3^{2n} \times 2^{4n}}$ (2 Marks)

---

4 If $3^{x} = 27$, $4^{x+y} = 1$ (2 Marks)

Find : The value of each of x , y

Test 2

Total mark: 10

Answer the following questions :

1 Choose the correct answer from the given ones : (3 Marks)

1 If $2^{x} = 11$, then $2^{x+1} =$ .....

(a) 22 (b) 12 (c) 112 (d) 212

2 $0.004 \times 0.00025 = 10^{.....}$

(a) 6 (b) 100 (c) 5 (d) – 6

3 $3^{x} + 3^{x} + 3^{x} = 1$, then $x =$ .....

(a) 3 (b) – 1 (c) – 3 (d) 1

---

2 Complete : (3 Marks)

1 $\left(\sqrt{3}+\sqrt{2}\right)^{10}\left(\sqrt{3}-\sqrt{2}\right)^{10} =$ .....

2 The multiplicative inverse of $\left|\left(\frac{2}{5}\right)^{-3}\right|$ is .....

3 If $7^{x-2} = 5^{x-2}$, then $x =$ .....

---

3 Find in $\mathbb{R}$ the S.S. of the equation : $(x-2)^{5} = 32$ (2 Marks)

---

4 Prove that : $\frac{9^{x+1} \times 4^{x}}{6^{2x}} = 9$ (2 Marks)

April tests ? on Geometry

Test 1

Total mark: 10

Answer the following questions :

1 Choose the correct answer from the given ones : (3 Marks)

1 The two triangles are similar if the corresponding ..... are proportional.

(a) sides (b) angles (c) vertices (d) diagonals

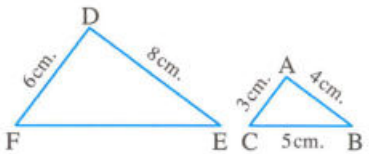
2 The length of the projection of a line segment on a given straight line ..... the length of the original line segment.

(a) ≥ (b) ≤ (c) > (d) =

3 **In the oppoiste figure :**

If Δ ABC ~ Δ DEF

, then the perimeter of Δ DEF =..... cm.



(a) 10 (b) 12 (c) 24 (d) 26

2 Complete : (3 Marks)

1 In a triangle , if the square of the length of a side is equal to the sum of the squares of the lengths of the other two sides , then .....

2 ABCD is a rectangle , then the projection of $\overline{AC}$ on $\overleftrightarrow{BC}$ is .....

3 If two polygons are similar and the ratio between the lengths of two corresponding sides is 5 : 8 , then the ratio between their perimeters is .....

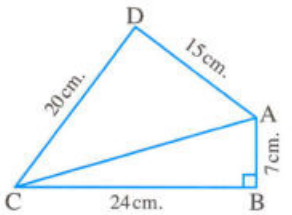
3 In the opposite figure : (2 Marks)

ABCD is a quadrilateral , m (∠ B) = 90°

, AB = 7 cm. , BC = 24 cm. , CD = 20 cm. , DA = 15 cm.

1 **Find :** The length of $\overline{AC}$

2 **Prove that :** m (∠ D) = 90°



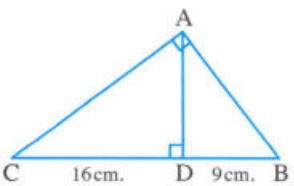
4 In the opposite figure : (2 Marks)

ABC is a right-angled triangle at A

, $\overline{AD} \perp \overline{BC}$

If BD = 9 cm. , CD = 16 cm.

Find the length of : $\overline{AB}$, $\overline{AC}$ and $\overline{AD}$



Test 2

Total mark: 10

Answer the following questions :

1 Choose the correct answer from the given ones : (3 Marks)

1 The projection of a ray on a straight line not perpendicular to it is .....

(a) a line segment. (b) a ray.

(c) a straight line. (d) a point.

2 All ..... are similar.

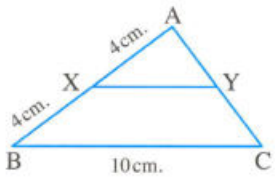
(a) rohmbuses (b) triangles (c) rectangles (d) squares

3 If the enlargement ratio of two simlilar polygons is ..... , then the two polygons are congruent.

(a) 1 (b) 2 (c) 0.5 (d) otherwise

2 Complete : (3 Marks)

1 **In the opposite figure :**



If $\Delta ABC \sim \Delta AXY$, AX = BX = 4 cm.

, BC = 10 cm. , then XY = ... cm.

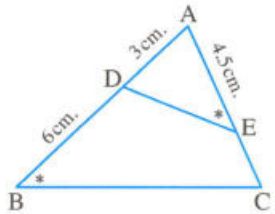
2 If $A \in \overline{BC}$, then the projection of A on $\overleftrightarrow{BC}$ is .....

3 In ΔXYZ , $(XY)^2 - (YZ)^2 = (XZ)^2$, then m ($\angle$ .....) = 90°

3 In the opposite figure : (2 Marks)

m ($\angle$ AED) = m ($\angle$ B) , AD = 3 cm.

, AE = 4.5 cm. , BD = 6 cm.



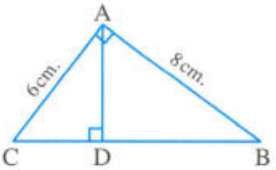
1 **Prove that :** $\Delta ABC \sim \Delta AED$

2 **Find :** The length of $\overline{EC}$

4 In the opposite figure : (2 Marks)

m ($\angle$ BAC) = 90° , $\overline{AD} \perp \overline{BC}$

, AB = 8 cm. , AC = 6 cm.



Find : 1 The length of $\overline{BC}$

2 The length of the prejection of $\overline{AB}$ on $\overleftrightarrow{BC}$

10 Marks

Model (1)

1 Choose the correct answer: (3)

a If a (c + d) + b (c + d)=15 and c + d = 5, then a + b = ...

1 10 2 3 3 75 4 5

b The S.S of the equation: $x^3 - x^2 = 0$ In R is ..... .

1 {0 , 1} 2 {0} 3 Ø 4 {1}

c The S.S of the equation: $x(x - 2)(x + 7) = 0$ In R is ..... .

1 {2 , –7} 2 {–2 , 7} 3 {0,2 , –7} 4 {0 , –2,7}

2 Complete: (3)

a $x(y - z) + m(y - z) = (y - z)$(.....)

b The S.S of the equation: $x^2 + 7x = 0$ In R is ..... .

c If $x + y = 7$ and a – 2b = 4, then the numerical value of the expression:

$a(x + y) - 2b(x + y)$ = ...

3 Factorize each of the following: (2)

a $x^4 + 4y^4$

b $ax - 7a + 3x - 21$

4 Find the S.S of the equation: (2)

$x^2 + 12 = 8x$ in R

10 Marks

Model (2)

1 Choose the correct answer: (3)

a The S.S of the equation: $x = \frac{4}{x}$ In R is ..... .

1 {4} **2** $\{\frac{1}{4}\}$ **3** {2 , –2} **4** $\{\frac{1}{4}, \frac{-1}{4}\}$

b The S.S of the equation: $x(x-2) - 2(2-x) = 0$ In R is ..... .

1 {2} **2** {–2} **3** {2 , –2} **4** {0}

c The S.S of the equation: $3x^2 + 15x - 18 = 0$ In R is ..... .

1 {1 , –6} **2** {–1 , 6} **3** {3} **4** {3 , –6,1}

2 Complete each of the following: (3)

a The S.S of $x^2 - 3x = 0$ in R is ..... .

b $ax + by + bx + ay =$ ..... .

c If $a + b = 2(x + y) = 14$, then $a(x + y) + b(x + y) =$ ..... .

3 Factorize each of the following: (2)

a $x^4 + 4$

b $a^2 - 4ab + 4b^2 - 25c^4$

4 A real number if you add it to its square, the result is 12, find that number. (2)

10 Marks

Model (3)

1 Choose the correct answer: (3)

a The expression: $x^4 + 4$ can be factorized as a perfect square by adding the term ..... and its additive inverse.

1 $4x^2$ **2** $2x^2$ **3** $8x^2$ **4** $16x^4$

b The factorization of $x^3 + 2x^2 - 4x - 8$ is ..... .

1 $(x^2 - 4)(x - 2)$ **2** $(x - 2)(x + 2)^2$ **3** $(x - 2)(x + 2)$ **4** $(x^2 + 4)(x - 2)$

c The S.S of the equation: $x^3 - 36x = 0$ In R is ..... .

1 {6 , –6} **2** Ø **3** {0} **4** {0,6 , –6}

2 Complete each of the following: (3)

a The S.S of the equation : $x^2 - 25 = 0$ in R is .....

b If $x + y = 4$, z + L = 5, then $xz + xL + yz + yL$ = ...

c $a^2 + 2ab + b^2 - c^2$ = ...

3 Factorize each of the following: (2)

a $x^4 + 64$

.....

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.....

b $5L + 10m + aL + 2am$

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4 A positive integer, if we add its square to its triple, the result will be 18. What is this integer? (2)

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10 Marks

Model (4)

1 Choose the correct answer: (3)

a The S.S of the equation: $x^2 - 5x + 6 = 0$ In R is ..... .

1 {1 , 6} **2** {–1 , –6} **3** {2 , 3} **4** {–3 , –2}

b $x(y - z) + L(y - z) + y - z = y - z$ (.....)

1 $x - L$ **2** $x + L$ **3** $x + L - 1$ **4** $x + L + 1$

c The S.S of the equation: $\frac{x}{4} = \frac{9}{x}$ In R is ..... .

1 {2 , 3} **2** {6} **3** {6 , –6} **4** $\{\frac{3}{2}\}$

2 Complete each of the following: (3)

a $x(y - z) + m(z - y) = (y - z)$ .....

b The S.S of the equation $x^2 + 3 = 0$ in R is .....

c The S.S of the equation $5x^2 - 2x = 0$ in R is .....

3 Factorize each of the following: (2)

a $81x^4 + 4z^4$

.....

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.....

.....

b $x^2 - 6xy + 9y^2 - 49a^2$

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4 Find in R the S.S of the equation: (2)

$x^2 - 5x = 14$

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10 Marks

Model (5)

1 Choose the correct answer: (3)

a The S.S of : $x^2 + 25 = 0$ In R is ..... .

1 {–5 , 5} **2** {5} **3** {–5} **4** Ø

b The S.S In R of the equation: $(x - 1)^2 = 0$ is ..... .

1 {0} **2** {–1} **3** {1 , –1} **4** {1}

c If a + b = 3, $x - y = 5$, then $a(x - y) - b(y - x)$ = ...

1 8 **2** 15 **3** –8 **4** –15

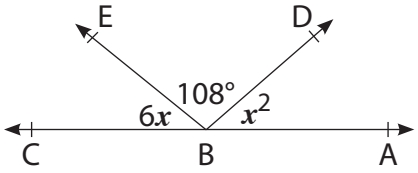
2 Complete each of the following: (3)

a The S.S of $x(x - 2)(x + 3) = 0$ in R is .....

b **In the opposite figure:**

B ∈ AC, m(∠ABD) = x^2,

m(∠DBE) = 108°, m(∠EBC) = $6x$, then x = ...



c The expression: $x^4 + 64y^4$ can be factorized using completing the square by adding the term ..... and its additive inverse.

3 Factorize each of the following: (2)

a $x^4 + 64y^4$

.....

.....

.....

.....

b $yx - 5x - 5y + 25$

.....

.....

.....

.....

4 The area of the rectangle whose length is 4cm more than its width is 21cm^2, find its dimensions. (2)

.....

.....

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.....

10 Marks

Model (1)

1 Choose the correct answer:

3

a The length of the diagonal of the square whose area is 50 cm^2 is ..... cm.

1 $5\sqrt{2}$ 2 15 3 12.5 4 10

b If the area of a trapezium is 100 cm^2 and its height is 5 cm, then the length of its middle base is ..... cm.

1 20 2 30 3 50 4 40

c If the side length of a rhombus is 10 cm and length of one of its diagonal is 16 cm, then its area = ... cm^2.

1 80 2 160 3 96 4 128

2 Complete:

3

a The diagonals of the isosceles trapezium are .....

b The area of a rhombus whose diagonal lengths are 8 cm and 10 cm is ..... cm^2.

c A trapezium whose base lengths are 6 cm, 10cm and its height is 12 cm, then its area equals ..... cm^2.

3 Answer the following:

4

a A trapezium its area is 48 cm^2 and its height is 6 cm. Find the length of its middle base, and if the length of one of its two bases is 7 cm, find the length of the other base.

.....

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b **In the opposite figure:**

ABC is a triangle, D ∈ $\overline{AB}$, E ∈ $\overline{AC}$, The area of Δ ABE = the area of Δ ACD.

Prove that: $\overline{DE}$ // $\overline{BC}$

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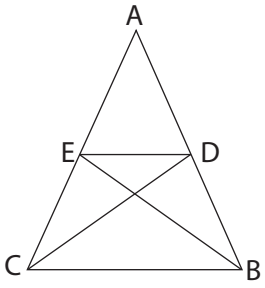

10 Marks

Model (2)

1 Choose the correct answer:

3

a A square whose diagonal length is 12 cm, its area = ... cm^2.

1 144 2 48 3 72 4 24

b The rhombus whose diagonal lengths are 6 cm,10 cm has the area = ...

1 60 cm^2 2 30 cm^2 3 15 cm^2 4 10 cm^2

c The lengths of the bases of a trapezium is 6 cm and 10 cm, then the length of its middle base is ..... cm.

1 16 2 15 3 9 4 8

2 Complete:

3

a The base angels of the isosceles trapezium are .....

b The area of the rhombus whose perimeter is 52 cm and the length of one of its diagonals is 10 cm equals ..... cm^2.

c The perimeter of a square is 24 cm, then its area equals ..... cm^2.

3 Answer the following:

4

a The area of a trapezium is 180 cm^2, its height is 12 cm. If the ratio between the lengths of the parallel bases is 3 : 2, **find the lengths of its parallel bases.**

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b **In the opposite figure:**

The area of Δ AEB = The area of Δ DEC

Prove that: $\overline{AD}$ // $\overline{BC}$

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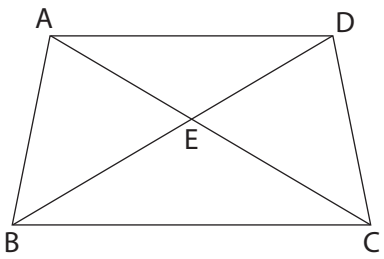

10 Marks

Model (3)

1 Choose the correct answer:

3

a A rhombus is of area 60 cm^2, and the length of one of its diagonals equals 10 cm, then the length of the other diagonal equals ..... cm.

1 4 2 8 3 10 4 12

b The area of the square = $\frac{1}{2}$ of the product of the lengths of its ..... .

1 sides 2 diagonals 3 heights 4 medians

c The area of the trapezium whose middle base is of length 7 cm, and its height is 6 cm equals ..... cm^2

1 21 2 40 3 42 4 13

2 Complete:

3

a The height of a trapezium with area 450 cm^2 and the lengths of its two parallel bases are 24 cm and 12 cm equals ..... cm.

b A square of side length 20 cm, then its area equals ..... cm^2.

c If two triangles are equal in area and drawn on the same base and on one side of it, then their vertices lie on a straight line ..... to this base.

3 Answer the following:

4

a A rhombus, the product of lengths of its diagonals is 72 cm^2, and its height is 9 cm.

Find the perimeter of the rhombus.

.....

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.....

b **In the opposite figure:**

ABCD is a quadrilateral its diagonals intersect at the point O, H $\in \overline{BO}$ where $\overline{OH} = \overline{OD}$, the area of Δ ABO = The area of Δ HOC

Prove that: $\overline{AD} // \overline{BC}$

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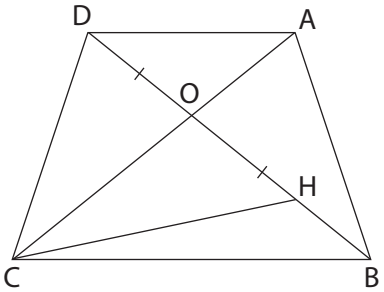


10 Marks

Model (4)

1 Choose the correct answer:

3

a The rhombus whose diagonal lengths are 6 cm, 8 cm, then its perimeter = ... cm.

1 24 2 48 3 20 4 96

b The area of the square whose diagonal length is 8 cm is = ... cm^2.

1 25 2 30 3 32 4 40

c If the product of lengths of the diagonals of a rhombus is 96 cm^2, and its height is 8 cm, then its side length = ... cm.

1 2 2 8 3 6 4 4

2 Complete:

3

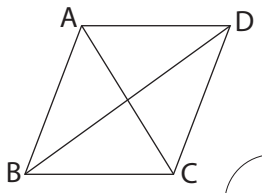
a If the area of a trapezium = 84 cm^2, and the length of the middle base = 12 cm, then its height = ...

b The rhombus whose base length is 8 cm and its height is 10 cm its area = ... cm^2.

c **In the opposite figure:**

Area of Δ ABC = area of Δ DBC,

have a common base ....., then $\overline{BC}$ // .....



3 Answer the following:

4

a The area of a trapezium is 88 cm^2, its height is 8 cm. And the length of one of the two parallel bases is 10 cm. **Find the length of the other base.**

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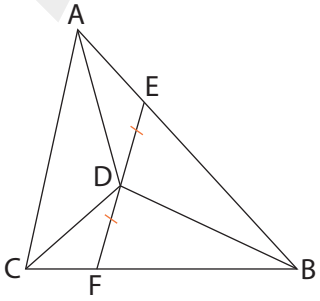
b **In the opposite figure:**

D is a midpoint of EF

The area of Δ ABD = The area of Δ CDB

Prove that: $\overline{AC}$ // $\overline{EF}$



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10 Marks

Model (5)

1 Choose the correct answer:

3

a The trapezium whose middle base length = 8 cm and its height = 5 cm its area = ... cm^2.

1 24 **2** 40 **3** 20 **4** 96

b If the area of a rhombus is 24 cm^2 and the length one of its diagonal is 6 cm, then the length of the other diagonal is ..... cm.

1 4 **2** 8 **3** 10 **4** 12

c If the area of a square is 72 cm^2, then its diagonal length is ..... cm.

1 6 **2** 8 **3** 36 **4** 12

2 Complete:

3

a A square its perimeter = 16 cm, then its area equals ..... cm^2.

b The area of a trapezium in which the lengths of the parallel bases are 6 cm, 10 cm and its height is 5 cm equals .....

c A rhombus whose perimeter is 28 cm and its height is 5 cm, then its area equals ..... cm^2.

3 Answer the following:

4

a Find the height of the trapezium whose area is 70 cm^2, and the two base lengths are 12 cm, 8 cm.

.....

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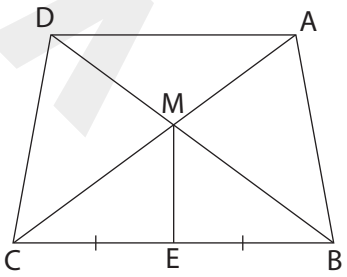
b **In the opposite figure:**

AC ∩ BD = {M}, E is a midpoint of BC,

The area of the figure ABEM = the area of the figure DCEM

Prove that: AD // BC



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10 Marks

Model (1)

1 Choose the correct answer: (3)

a If a (c + d) + b (c + d)=15 and c + d = 5, then a + b = ...

1 10 **2 3** 3 75 4 5

b The S.S of the equation: $x^3 - x^2 = 0$ In R is ..... .

1 {0 , 1} 2 {0} 3 Ø 4 {1}

c The S.S of the equation: $x(x - 2)(x + 7) = 0$ In R is ..... .

1 {2 , –7} 2 {–2 , 7} **3 {0,2 , –7}** 4 {0 , –2,7}

2 Complete: (3)

a $x(y - z) + m(y - z) = (y - z)$(x + m)

b The S.S of the equation: $x^2 + 7x = 0$ In R is {0 , –7}.

c If $x + y = 7$ and a – 2b = 4, then the numerical value of the expression:

$a(x + y) - 2b(x + y) =$ **28 .**

3 Factorize each of the following: (2)

a $x^4 + 4y^4$

Middle term $= \pm 2\sqrt{x^4} \times \sqrt{4y^4}$

$= \pm 4x^2y^2$

$\therefore x^4 + 4x^2y^2 + 4y^4 - 4x^2y^2$

$= (x^2 + 2y^2)^2 - (2xy)^2$

$= (x^2 + 2y^2 + 2xy)(x^2 + 2y^2 - 2xy)$

b $ax - 7a + 3x - 21$

$ax - 7a + 3x - 21$

$= a(x - 7) + 3(x - 7)$

$= (x - 7)(a + 3)$

4 Find the S.S of the equation: (2)

$x^2 + 12 = 8x$ in R

$x^2 + 12 = 8x$

$\therefore x^2 - 8x + 12 = 0$

$\therefore (x - 2)(x - 6) = 0$

$\therefore x = 2 , x = 6$

$\therefore$ S.S = {2,6}

10 Marks

Model (2)

1 Choose the correct answer: (3)

a The S.S of the equation: $x = \frac{4}{x}$ In R is ..... .

1 {4} 2 $\{\frac{1}{4}\}$ 3 {2 , –2} 4 $\{\frac{1}{4}, \frac{-1}{4}\}$

b The S.S of the equation: $x(x-2) - 2(2-x) = 0$ In R is ..... .

1 {2} 2 {–2} 3 {2 , –2} 4 {0}

c The S.S of the equation: $3x^2 + 15x - 18 = 0$ In R is ..... .

1 {1 , –6} 2 {–1 , 6} 3 {3} 4 {3 , –6,1}

2 Complete each of the following: (3)

a The S.S of $x^2 - 3x = 0$ in R is {0 , 3} .

b $ax + by + bx + ay = (a + b)(x + y)$

c If $a + b = 2(x + y) = 14$, then $a(x + y) + b(x + y) = 98$.

3 Factorize each of the following: (2)

a $x^4 + 4$

Middle term $= \pm 4x^2$

$\therefore x^4 + 4x^2 + 4 - 4x^2$

$= (x^2 + 2)^2 - (2x)^2$

$= (x^2 + 2 + 2x)(x^2 + 2 - 2x)$

b $a^2 - 4ab + 4b^2 - 25c^4$

$a^2 - 4ab + 4b^2 - 25c^4$

$= (a - 2b)^2 - (5c^2)^2$

$= (a + 2b + 5c^2)(a + 2b - 5c^2)$

4 A real number if you add it to its square, the result is 12, find that number. (2)

Let the number is x, its square $= x^2$

$\therefore x^2 + x = 12$

$\therefore x^2 + x - 12 = 0$

$\therefore (x + 4)(x - 3) = 0$

$\therefore x = -4$ or $x = 3$

The number is –4 or 3

10 Marks

Model (3)

1 Choose the correct answer: (3)

a The expression: $x^4 + 4$ can be factorized as a perfect square by adding the term ..... and its additive inverse.

1 $4x^2$ **2** $2x^2$ **3** $8x^2$ **4** $16x^4$

b The factorization of $x^3 + 2x^2 - 4x - 8$ is ..... .

1 $(x^2 - 4)(x - 2)$ **2** $(x - 2)(x + 2)^2$ **3** $(x - 2)(x + 2)$ **4** $(x^2 + 4)(x - 2)$

c The S.S of the equation: $x^3 - 36x = 0$ In R is ..... .

1 {6 , –6} **2** Ø **3** {0} **4** {0,6 , –6}

2 Complete each of the following: (3)

a The S.S of the equation : $x^2 - 25 = 0$ in R is {5 , –5} .

b If $x + y = 4$, z + L = 5, then $xz + xL + yz + yL$ = 20 .

c $a^2 + 2ab + b^2 - c^2$ = (a + b + c)(a + b – c)

3 Factorize each of the following: (2)

a $x^4 + 64$

Middle term= $\pm 16x^2$

$\therefore x^4 + 16x^2 + 64 - 16x^2$

$= (x^2 + 8)^2 - (4x)^2$

$= (x^2 + 8 + 4x)(x^2 + 8 - 4x)$

b $5L + 10m + aL + 2am$

$5L + 10m + aL + 2am$

$= 5(L + 2m) + a(L + 2m)$

$= (L + 2m)(a + 5)$

4 A positive integer, if we add its square to its triple, the result will be 18. (2)

What is this integer?

Let the number is x, its square = x^2 , its triple = $3x$

$\therefore x^2 + 3x = 18$

$\therefore x^2 + 3x - 18 = 0$

$\therefore (x + 6)(x - 3) = 0$

$x = -6$ (refused) or $x = 3$

$\therefore$ The positive integer is 3

10 Marks

Model (4)

1 Choose the correct answer: (3)

a The S.S of the equation: $x^2 - 5x + 6 = 0$ In R is ..... .

1 {1 , 6} 2 {–1 , –6} 3 {2 , 3} 4 {–3 , –2}

b $x(y-z) + L(y-z) + y - z = y - z$ (.....)

1 $x - L$ 2 $x + L$ 3 $x + L - 1$ 4 $x + L + 1$

c The S.S of the equation: $\frac{x}{4} = \frac{9}{x}$ In R is ..... .

1 {2 , 3} 2 {6} 3 {6 , –6} 4 $\{\frac{3}{2}\}$

2 Complete each of the following: (3)

a $x(y-z) + m(z-y) = (y-z)$ $(x - m)$

b The S.S of the equation $x^2 + 3 = 0$ in R is Ø .

c The S.S of the equation $5x^2 - 2x = 0$ in R is $\{0 , \frac{2}{5}\}$.

3 Factorize each of the following: (2)

a $81x^4 + 4z^4$

Middle term $= \pm 36x^2z^2$

$\therefore 81x^4 + 36x^2z^2 + 4z^4 - 36x^2z^2$

$= (9x^2 + 2z^2)^2 - (6xz)^2$

$= (9x^2 + 2z^2 + 6xz)(9x^2 + 2z^2 - 6xz)$

b $x^2 - 6xy + 9y^2 - 49a^2$

$x^2 + 6xy + 9y^2 - 49a^2$

$= (x + 3y)^2 - (7a)^2$

$= (x + 3y + 7a)(x + 3y - 7a)$

4 Find in R the S.S of the equation: (2)

$x^2 - 5x = 14$

$x^2 - 5x = 14$

$\therefore (x - 7)(x + 2) = 0$

$\therefore x = 7$ or $x = -2$

$\therefore$ S.S $= \{7 , -2\}$

10 Marks

Model (5)

1 Choose the correct answer: (3)

a The S.S of : $x^2 + 25 = 0$ In R is ..... .

1 {–5 , 5} **2** {5} **3** {–5} **4** Ø

b The S.S In R of the equation: $(x - 1)^2 = 0$ is ..... .

1 {0} **2** {–1} **3** {1 , –1} **4** {1}

c If a + b = 3, $x - y = 5$, then $a(x - y) - b(y - x)$ = ...

1 8 **2** 15 **3** –8 **4** –15

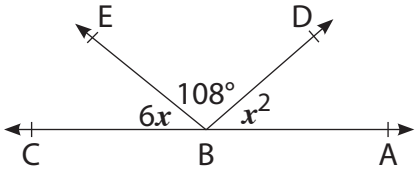
2 Complete each of the following: (3)

a The S.S of $x(x - 2)(x + 3) = 0$ in R is {0,2 , –3} .

b **In the opposite figure:**

B ∈ AC, m(∠ABD) = x^2,

m(∠DBE) = 108°, m(∠EBC) = $6x$, then x = 6°



c The expression: $x^4 + 64y^4$ can be factorized using completing the square by adding the term $16x^2y^2$ and its additive inverse.

3 Factorize each of the following: (2)

a $x^4 + 64y^4$

Middle term= $\pm 16x^2y^2$

$\therefore x^4 + 16x^2y^2 + 64y^4 - 16x^2z^2$

$= (x^2 + 8y^2)^2 - (4xy)^2$

$= (x^2 + 8y^2 + 4xy)(x^2 + 8y^2 - 4xy)$

b $yx - 5x - 5y + 25$

$yx - 5x - 5y + 25$

$= x(y - 5) - 5(y - 5)$

$= (y - 5)(x - 5)$

4 The area of the rectangle whose length is 4cm more than its width is 21cm^2, find its dimensions. (2)

Let the width is x, its length is $x + 4$

Area = length × width

$\therefore x(x + 4) = 21$

$\therefore x^2 + 4x - 21 = 0$

$\therefore (x + 7)(x - 3) = 0$

$\therefore x = -7$ (refused) or $x = 3$

$\therefore$ Width = 3cm

Length = 3 + 4 = 7 cm

10 Marks

Model (1)

1 Choose the correct answer:

3

a The length of the diagonal of the square whose area is 50 cm^2 is ..... cm.

1 $5\sqrt{2}$ **2** 15 **3** 12.5 **4** **10**

b If the area of a trapezium is 100 cm^2 and its height is 5 cm, then the length of its middle base is ..... cm.

1 **20** **2** 30 **3** 50 **4** 40

c If the side length of a rhombus is 10 cm and length of one of its diagonal is 16 cm, then its area = ... cm^2.

1 80 **2** 160 **3** **96** **4** 128

2 Complete:

3

a The diagonals of the isosceles trapezium are **equal in length**.

b The area of a rhombus whose diagonal lengths are 8 cm and 10 cm is **40** cm^2.

c A trapezium whose base lengths are 6 cm, 10cm and its height is 12 cm, then its area equals **96** cm^2.

3 Answer the following:

4

a A trapezium its area is 48 cm^2 and its height is **6 cm**. Find the length of its middle base, and if the length of one of its two bases is **7 cm**, **find the length of the other base.**

∵ **Area of a trapezium = the middle base × height**

∴ **The middle base** $= \frac{48}{6} = 8$ **cm**

∵ **The middle base** $= \frac{b_1 + b_2}{2}$

∴ $8 = \frac{7 + b_2}{2}$ ∴ $b_2 = 8 \times 2 - 7 = 9$ **cm**

b **In the opposite figure:**

ABC is a triangle, D ∈ $\overline{AB}$, E ∈ $\overline{AC}$, The area of Δ ABE = the area of Δ ACD.

Prove that: $\overline{DE}$ // $\overline{BC}$

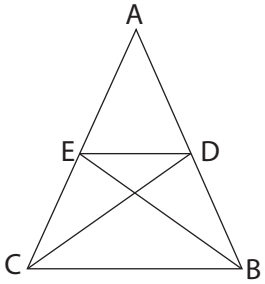
∵ **Area of Δ ABE = Area of Δ ACD**

By subtracting Area of Δ AED

∴ **Area of Δ ECD = area of Δ DBE,**

∵ $\overline{ED}$ **is a common base**

∴ $\overline{DE}$ // $\overline{BC}$



10 Marks

Model (2)

1 Choose the correct answer:

3

a A square whose diagonal length is 12 cm, its area = ... cm^2.

1 144 2 48 3 72 4 24

b The rhombus whose diagonal lengths are 6 cm,10 cm has the area = ...

1 60 cm^2 2 30 cm^2 3 15 cm^2 4 10 cm^2

c The lengths of the bases of a trapezium is 6 cm and 10 cm, then the length of its middle base is ..... cm.

1 16 2 15 3 9 4 8

2 Complete:

3

a The base angels of the isosceles trapezium are equal in measure.

b The area of the rhombus whose perimeter is 52 cm and the length of one of its diagonals is 10 cm equals 120 cm^2.

c The perimeter of a square is 24 cm, then its area equals 36 cm^2.

3 Answer the following:

4

a The area of a trapezium is 180 cm^2, its height is 12 cm. If the ratio between the lengths of the parallel bases is 3 : 2, find the lengths of its parallel bases.

The middle base = $\frac{180}{12}$ = 15 cm

Let the length of two parallel bases are $2x$ and $3x$

$\therefore 15 = \frac{2x + 3x}{2}$

$\therefore 5x = 30$

$\therefore x = 6$

$\therefore$ The length of the parallel bases = 12 cm and 18 cm

b **In the opposite figure:**

The area of Δ AEB = The area of Δ DEC

Prove that: $\overline{AD}$ // $\overline{BC}$

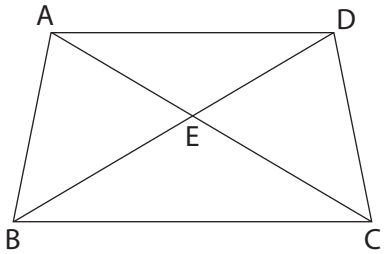
$\because$ Area of Δ AEB = Area of Δ DEC

By adding Area of Δ AED

$\therefore$ Area of Δ ABD = area of Δ DCA,

$\because$ AD is a common base

$\therefore \overline{AD}$ // $\overline{BC}$



10 Marks

Model (3)

1 Choose the correct answer: (3)

a A rhombus is of area 60 cm^2, and the length of one of its diagonals equals 10 cm, then the length of the other diagonal equals ..... cm.

1 4 2 8 3 10 4 **12**

b The area of the square = $\frac{1}{2}$ of the product of the lengths of its ..... .

1 sides 2 **diagonals** 3 heights 4 medians

c The area of the trapezium whose middle base is of length 7 cm, and its height is 6 cm equals ..... cm^2

1 21 2 40 3 **42** 4 13

2 Complete: (3)

a The height of a trapezium with area 450 cm^2 and the lengths of its two parallel bases are 24 cm and 12 cm equals **25** cm.

b A square of side length 20 cm, then its area equals **400** cm^2.

c If two triangles are equal in area and drawn on the same base and on one side of it, then their vertices lie on a straight line **parallel** to this base.

3 Answer the following: (4)

a A rhombus, the product of lengths of its diagonals is 72 cm^2, and its height is 9 cm.

Find the perimeter of the rhombus.

Area of rhombus = $\frac{1}{2}$ product of its diagonals = $\frac{1}{2} \times 72 = 36\ cm^2$

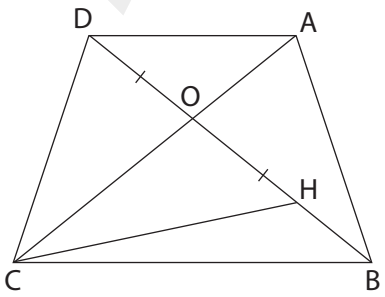
$\therefore$ Side length = $\frac{\text{Area}}{\text{Height}} = \frac{36}{9} = 4$ cm

$\therefore$ Perimeter of the rhombus = side length $\times 4 = 4 \times 4 = 16$ cm

b **In the opposite figure:**

ABCD is a quadrilateral its diagonals intersect at the point O, H $\in \overline{BO}$ where $\overline{OH} = \overline{OD}$, the area of Δ ABO = The area of Δ HOC

Prove that: $\overline{AD} // \overline{BC}$



In Δ HDC: $\because$ CO is a median

$\therefore$ Area of Δ HOC = area of Δ DOC ⟶ 1

$\therefore$ Area of Δ HOC = area of Δ ABO ⟶ 2

From 1 and 2 : $\therefore$ Area of Δ DOC = Area of Δ ABO

By adding area of Δ AOD

$\because$ Area of Δ ACD = Area of Δ DBA,

$\because$ AD is a common base

$\therefore \overline{AD} // \overline{BC}$

10 Marks

Model (4)

1 Choose the correct answer: (3)

a The rhombus whose diagonal lengths are 6 cm, 8 cm, then its perimeter = ... cm.

1 24 2 48 3 20 4 96

b The area of the square whose diagonal length is 8 cm is = ... cm^2.

1 25 2 30 3 32 4 40

c If the product of lengths of the diagonals of a rhombus is 96 cm^2, and its height is 8 cm, then its side length = ... cm.

1 2 2 8 3 6 4 4

2 Complete: (3)

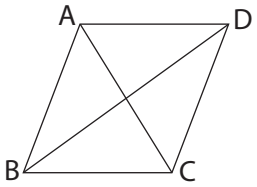
a If the area of a trapezium = 84 cm^2, and the length of the middle base = 12 cm, then its height = 7.

b The rhombus whose base length is 8 cm and its height is 10 cm its area = 80 cm^2.

c **In the opposite figure:**

Area of Δ ABC = area of Δ DBC,

have a common base BC, then $\overline{BC}$ // $\overline{AD}$



3 Answer the following: (4)

a The area of a trapezium is 88 cm^2, its height is 8 cm. And the length of one of the two parallel bases is 10 cm. **Find the length of the other base.**

$\text{Area} = \frac{b_1 + b_2}{2} \times H$ $\quad \therefore 88 = \frac{10 + b_2}{2} \times 8$ $\quad \therefore b_2 + 10 = \frac{88}{8} \times 2$

$\therefore b_2 + 10 = 22$ $\quad \therefore b_2 = 22 - 10$

$\therefore b_2 = 12$ cm

b **In the opposite figure:**

D is a midpoint of EF

The area of Δ ABD = The area of Δ CDB

Prove that: $\overline{AC}$ // $\overline{EF}$

In Δ BEF: ∵ BD is a median

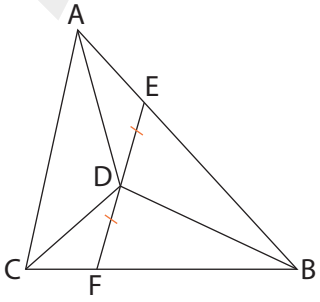
∴ Area of Δ BDE = area of Δ BDF ⟶ 1

∵ Area of Δ ABD = area of Δ CDB ⟶ 2

By subtracting 1 from 2

∵ Area of Δ ADE = Area of Δ CDF, ∵ DE = DF

∴ $\overline{AC}$ // $\overline{EF}$



10 Marks

Model (5)

1 Choose the correct answer:

3

a The trapezium whose middle base length = 8 cm and its height = 5 cm its area = ... cm^2.

1 24 **2** 40 **3** 20 **4** 96

b If the area of a rhombus is 24 cm^2 and the length one of its diagonal is 6 cm, then the length of the other diagonal is ..... cm.

1 4 **2** 8 **3** 10 **4** 12

c If the area of a square is 72 cm^2, then its diagonal length is ..... cm.

1 6 **2** 8 **3** 36 **4** 12

2 Complete:

3

a A square its perimeter = 16 cm, then its area equals 16 cm^2.

b The area of a trapezium in which the lengths of the parallel bases are 6 cm, 10 cm and its height is 5 cm equals 40 cm^2.

c A rhombus whose perimeter is 28 cm and its height is 5 cm, then its area equals 35 cm^2.

3 Answer the following:

4

a Find the height of the trapezium whose area is 70 cm^2, and the two base lengths are 12 cm, 8 cm.

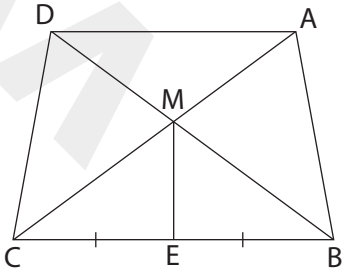
Height = area $\div \frac{b_1 + b_2}{2}$ $\therefore 70 \div \frac{12+8}{2} = 70 \div 10 = 7$ cm

b **In the opposite figure:**

AC $\cap$ BD = {M}, E is a midpoint of BC,

The area of the figure ABEM = the area of the figure DCEM

Prove that: AD // BC



$\because$ In Δ MBC: $\because$ ME is a median

$\therefore$ Area of Δ MEB = area of Δ MEC ⟶ 1

$\because$ Area of figure ABEM = area of figure DCEM ⟶ 2

By adding 1 and 2

$\because$ Area of Δ MEB + area of figure DCEM = Area of Δ MEC + Area of figure ABEM

$\therefore$ Area of Δ ABC = Area of Δ DCB

$\because$ $\overline{BC}$ is a common base

$\therefore$ $\overline{AD}$ // $\overline{BC}$

Lesson (5)
Factorizing the sum and the difference of two cubes

The sum of two cubes of two quantities =

(the first + the second) (the square of the first – the first × the second + the square of the second)

i.e. $a^3 \oplus b^3 = (a + b)(a^2 \ominus ab + b^2)$

The difference between two cubes of two quantities =

(the first – the second) (the square of the first + the first × the second + the square of the second)

i.e. $a^3 \ominus b^3 = (a - b)(a^2 \oplus ab + b^2)$

Complete each of the following :

1.	$x^3 - 1 = (x - 1)$ (.....)
2.	$x^{12} + y^{15}$ = (..... + ...) (..... – ..... + ...)
3.	If $x - 3$ is a factor of the expression $x^3 - 27$, then the second factor is .....
4.	If $x + y = 2$, $x^2 - xy + y^2 = 8$, then $x^3 + y^3$ = ...
5.	If $(a + b)^2 = 16$, $a^2 + b^2 = 8$, then $2ab$ = ...

Homework

1.	$8a^3 + 125$ = (..... + ...) ($4a^2 - 10a$ + ...)
2.	$8a^3$ – ..... = (..... – .....) (..... + ... + 9)
3.	If $4a^2 - 2a + 1$ is a factor of the expression $8a^3 + 1$, then the other factor is .....

4. $2x^2 - 7x - 15 = (2x + 3)$ (.....)

5. If $kx^2 + 4x + 1$ is a perfect square , then k = ...

6. If $(x + 2)$ is a factor of the expression : $x^2 - x - 6$, then the other factor is .....

7. If $x^2 + ax + 5$ can be factorized , then a = ...

Choose the correct answer :

1. If $x^3 - y^3 = 14$, $x^2 + xy + y^2 = 7$, then $x - y$ = ...
(a) 2 (b) 7 (c) 14 (d) – 2

2. If $y^3 - a = (y - 2)(y^2 + 2y + 4)$, then a = ...
(a) 2 (b) 4 (c) 8 (d) – 8

3. If $x^3 + 27 = (x + 3)(x^2 + k + 9)$, then "k" equals .....
(a) $-6x$ (b) $-3x$ (c) $3x$ (d) $6x$

4. $(x - y)(x + y)(x^4 + x^2y^2 + y^4)$ = ...
(a) $x^3 - y^3$ (b) $x^3 + y^3$ (c) $x^6 - y^6$ (d) $x^6 + y^6$

5. If $a^2 + b^2 = 11$, $ab = 5$, then $a - b$ = ...
(a) 6 (b) ± 1 (c) 1 (d) – 1

6. If $a - b = 5$, then $a^2 - 2ab + b^2$ = ...
(a) 25 (b) 20 (c) 15 (d) 10

Homework

1. 📖 If $x + y = 3$, $x^2 - xy + y^2 = 5$, then $x^3 + y^3$ = ...
(a) 15 (b) 25 (c) 8 (d) 7

2. If $x^3 + y^3 = 28$, $x + y = 2$, then $x^2 - xy + y^2$ = ...
(a) 28 (b) 14 (c) 2 (d) 7

3. If $x^3 - 8 = (x + a)(x^2 + 2x + 4)$, then a = ...
(a) 4 (b) – 4 (c) 2 (d) – 2

4. $x^3 - k^3 = (x - k)(x^2 + 4x + k^2)$, then k = ...
(a) 2 (b) 4 (c) 16 (d) 64

5. $x^3 + 8 = (x + 2)$ (.....)

(a) $x - 2$ (b) $x^2 + 2x + 4$ (c) $x^2 - 4x + 4$ (d) $x^2 - 2x + 4$

6. If $x^3 + 8 = (x + 2)(x^2 + a + 4)$, then a = ...

(a) x (b) $-x$ (c) $-4x$ (d) $-2x$

7. If $x^2 + e - 16 = (x + 4)(x - 4)$, then e = ...

(a) 8^x (b) zero (c) $-8x$ (d) $-4x$

8. $(x^3 + 64) \div (x + 4)$ = ...

(a) $x^2 + 16$ (b) $x^2 - 4x + 16$

(c) $x^2 + 4x + 16$ (d) $x^2 - 4x - 16$

9. $3x^2y + 6xy$ = ... $(x + 2)$

(a) $3x$ (b) $3xy^2$ (c) x^2y (d) $3xy$

10. $(64)^2 - (36)^2$ = ...

(a) 100 (b) 28 (c) 2800 (d) 280

Factorize each of the following perfectly:

1. $8x^3 - 125$

2. $m^3 + 64n^3$

3. $\frac{1}{8}a^3 - 8b^3$

.....

4. $0.027m^3 - n^3$

5. $8x^3 - 343y^6$

6. $16a^3b + 686b^4$

.....

7. $x^6 - 7x^3 - 8$

.....

8. If $x^2 - y^2 = 20$, $x - y = 2$, $x^2 - xy + y^2 = 28$
Find the value of $x^3 + y^3$

.....

9. **Factorize the following expression perfectly :** $(x^3 - 9)(x^3 + 9) + 17$

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Homework

1. $x^3 + 8$

2. $x^3 - 1$

3. $512\,x^3 - y^3$

4. $\ell^3\,m - 27\,m^4$

5. $m^6 + 7m^3 - 8$

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Lesson (6)
Factorizing by grouping

Factorize each of the following perfectly:

1. $a\,x + b\,x + a\,y + by$

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2. $am - an + m - n$

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3. $a^2 + 2ab + b^2 - c^2$

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Homework

1. $xy + 5y + 7x + 35$

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2. $5\ell - 10m - a\ell + 2am$

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3. $9x^2 - 4a^2 + y^2 + 6xy$

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4. $abx^2 + bx - ax - 1$

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5. $25x^2 - 30x + 9 - 16y^2$

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6. $x^2 - 9a^2 + y^2 + 2xy$

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Lesson (7)
Factorizing by completing the square

The method of factorization by completing the square :

1. We add to the given expression twice the product of the two square roots of the two perfect square terms and subtract it again not to change the main expression.
2. Using the commutative and associative properties , we rewrite the expression after ordering its terms to get the form :
   a perfect square trinomial – a perfect square monomial
3. We factorize the resultant expression as a difference between two squares.
4. If it is possible , we should factorize the resultant expressions (resultant factors) in order that the factorization is perfect.

Factorize each of the following perfectly:

1. $x^4 + 4y^4$

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2. $a^4 + 2500\,b^4$

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3. $8x^4y^2 + 162z^4y^2$

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4. $x^4 + 9x^2 + 81$

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5.

$m^4 - 11\ m^2n^2 + n^4$

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6. $4\ x^4 + 25\ y^4 - 29\ x^2\ y^2$

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Homework

1. $81\ x^4 + 4\ z^4$

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2. $4\ x^4 + 625\ z^4$

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3. $9\ x^4 - 25\ x^2 + 16$

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4. $x^4 + x^2\ y^2 + 25\ y^4$

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5. $16\ x^4 - 28\ x^2\ y^2 + 9\ y^4$

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Lesson (8)
Solving quadratic equations in one variable algebraically

Complete each of the following :

1. If -5 is a root of the equation : $x^2 + 2x - 15 = 0$, then the other root is .....

2. If $x = 2$ is a root of the equation : $x^2 - 6x + k = 0$, then k = ... and the other root is .....

3. If one of the roots of the equation : $2x^2 + 8x = 0$ is a root of the equation : $x^2 + 5x + a = 0$, then a = ... or .....

Homework

1. If the number 9 is a solution of the equation : $x^2 + k = 0$, then k = ...

2. The solution set of the equation : $x^2 + 25 = 0$ in $\mathbb{R}$ is .....

3. The solution set of the equation $x^2 = 4x$ in $\mathbb{R}$ is .....

Choose the correct answer :

1. The S.S. of the equation : $3(x-2)(x+5) = 0$ in $\mathbb{R}$ is .....
   (a) $\{0, 2, -5\}$ (b) $\{3, 2, -5\}$ (c) $\{2, -5\}$ (d) $\{-2, 5\}$

2. The S.S. of the equation : $x^2 - 4 = 0$ in $\mathbb{R}$ is .....
   (a) $\{4\}$ (b) $\{4, -4\}$ (c) $\{2\}$ (d) $\{2, -2\}$

3. The S.S. of the equation : $x^2 + 25 = 0$ in $\mathbb{R}$ is .....
   (a) $\{5\}$ (b) $\{5, -5\}$ (c) $\{-5\}$ (d) $\varnothing$

4. The equation whose roots are 3 and 5 is .....
   (a) $5x^2 + 8x + 3 = 0$ (b) $2x^2 + 8x - 15 = 0$
   (c) $x^2 - 8x + 15 = 0$ (d) $3x^2 + 8x + 5 = 0$

5. The S.S. of the equation : $x(x-3) = 5x$ in $\mathbb{R}$ is .....
   (a) $\{3\}$ (b) $\{0, 3, 5\}$ (c) $\{3, 5\}$ (d) $\{0, 8\}$

6. The S.S. of the equation : $\frac{4}{x} = \frac{x}{9}$ in $\mathbb{R}$ is .....

(a) $\{4 , 9\}$ (b) $\{6 , -6\}$ (c) $\{6\}$ (d) $\{36\}$

7. If the number 4 is a solution of the equation : $x^2 + x - 20 = 0$, then the other solution is .....

(a) 20 (b) 5 (c) -5 (d) -4

Homework

1. The S.S. of the equation : $(x-4)^2 = 0$ in $\mathbb{R}$ is .....

(a) $\{4\}$ (b) $\{0 , 4\}$ (c) $\{0 , -4\}$ (d) $\{-4\}$

2. The solution set of the equation : $x(x-3) = 0$ in $\mathbb{R}$ is .....

(a) $\{3\}$ (b) $\{0 , 3\}$ (c) $\{0 , -3\}$ (d) $\{0\}$

3. If $3x^2 + c\,x - 6 = (3x-2)(x+3)$, then c = ...

(a) 7 (b) 12 (c) 13 (d) 5

4. The expression : $x^2 + 6x + a$ is a perfect square when a = ...

(a) 6 (b) 16 (c) 1 (d) 9

5. $x^3 + y^3 = (.....)(x^2 - xy + y^2)$

(a) $x^2 + y^2$ (b) $x^2 - y^2$ (c) $x + y$ (d) $x - y$

6. One of the factors of the expression : $x^2 - 3x - 18$ is .....

(a) $x - 3$ (b) $x - 6$ (c) $x - 9$ (d) $x - 18$

Find in R the solution set of each of the following equations:

1. $x^2 - 7x - 30 = 0$

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.....

2. $2x^2 + 7x = 0$

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3. $(x+2)^2 = 25$

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4. $(x-3)(x+5)=20$

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5. $x-\frac{2}{x}=\frac{7}{2}$

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6. $x(x-1)=6$

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7. $3x^3=12x$

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8. $x^3-4x=0$

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9. $x^4-13x^2+36=0$

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10. If : $x^2+\frac{1}{x^2}=34$, then **find** : $x+\frac{1}{x}$

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11. If : $x + \frac{1}{x} = 2$, then find : $x^2 + \frac{1}{x^2}$

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Homework

1. $x^2 - 5x - 6 = 0$

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2. $x^2 - 6x = -9$

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3. $x - \frac{3}{x} = 2$

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4. $x^2 - 5x = 0$

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5. $4x^2 = 25$

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Lesson (15)
Equality of the areas of two triangles

Theorem 2

Two triangles which have the same base and the vertices opposite to this base on a straight line parallel to the base have the same area.

Corollary 1

Triangles of bases equal in length and lying between two parallel straight lines are equal in area.

Corollary 2

The median of a triangle divides its surface into two triangular surfaces equal in area.

Corollary 3

Triangles with congruent bases on one straight line and have a common vertex are equal in areas.

Theorem 3

If two triangles are equal in area and drawn on the same base and on one side of it , then their vertices lie on a straight line parallel to this base.

Complete each of the following :

1. If ABC is a triangle , D is the midpoint of $\overline{BC}$, then :
   The area of Δ ABD = the area of Δ .....
2. If $\overline{XL}$ is a median in Δ XYZ , then the area of Δ XYZ = ... the area of Δ XYL
3. The triangle XYZ in which $L \in \overline{YZ}$ such that $YL = \frac{1}{2} LZ$, then:
   The area of Δ XYL = ... the area of Δ XYZ

Homework .

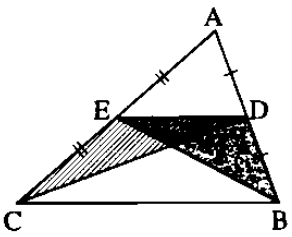
1. The two triangles drawn on a common base and their vertices located on a straight line parallel to the base are .....
2. Triangles with congruent bases and drawn between two parallel lines are .....
3. The median in the triangle divides its area into .....

Essay problems:

1. **In the opposite figure :**

D is the midpoint of $\overline{AB}$ and E is the midpoint of $\overline{AC}$

Prove that : The area of Δ BDE equals the area of Δ CDE



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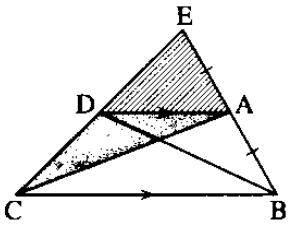
2. **In the opposite figure :**

ABCD is a quadrilateral in which $\overline{AD}$ // $\overline{BC}$ and $\overrightarrow{BA} \cap \overrightarrow{CD} = \{E\}$

such that BA = AE

Prove that : The area of Δ ADC = the area of Δ ADE



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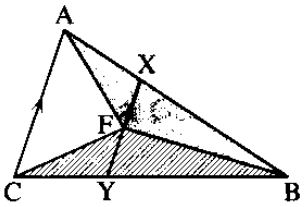
3. 📖 **In the opposite figure :**

$\overline{AC}$ // $\overline{XY}$ and F is the midpoint of $\overline{XY}$



Prove that : The area of Δ ABF = the area of Δ CBF

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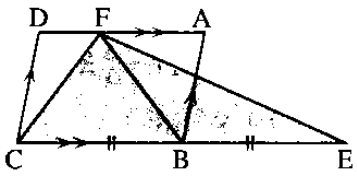
4. 📖 **In the opposite figure :**

ABCD is a parallelogram. E $\in \overrightarrow{CB}$ where BC = BE



Prove that : The area of Δ FEC = the area of ▱ ABCD

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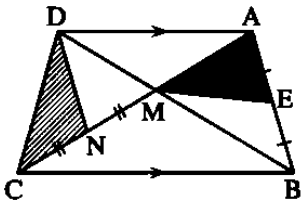
5. **In the opposite figure :**

ABCD is a quadrilateral whose diagonals intersect at M,

$\overline{AD}$ // $\overline{BC}$ and E is the midpoint of $\overline{AB}$,

N is the midpoint of $\overline{MC}$



Prove that : The area of Δ AEM = the area of Δ DNC

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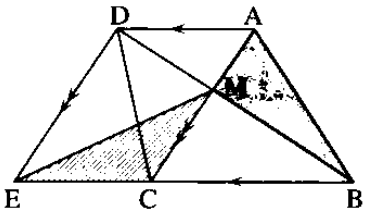
6. **In the opposite figure :**

$\overleftrightarrow{AD}$ // $\overleftrightarrow{BC}$, E ∈ $\overrightarrow{BC}$ and $\overleftrightarrow{AC}$ // $\overleftrightarrow{DE}$,

$\overline{AC} \cap \overline{BD} = \{M\}$



Prove that :

1 The area of Δ ABM = the area of Δ DCM = the area of Δ EMC

2 The area of Δ DBC = the area of Δ EBM

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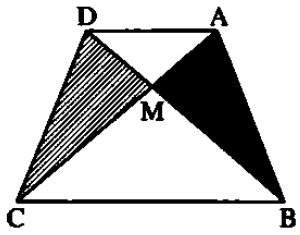
7. 📖 **In the opposite figure :**



ABCD is a quadrilateral , its diagonals intersect at M

and the area of Δ ABM = the area of Δ DCM

Prove that : $\overline{AD} \parallel \overline{BC}$

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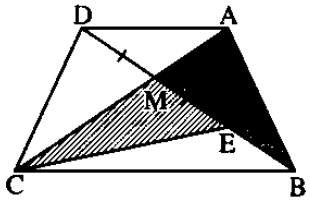
8. 📖 **In the opposite figure :**



ABCD is a quadrilateral whose diagonals are intersecting at M

and E $\in \overline{BM}$ where ME = MD

The area of Δ AMB = the area of Δ CME

Prove that : $\overline{AD} \parallel \overline{BC}$

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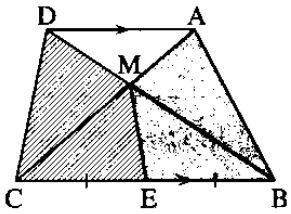
Homework

1. **In the opposite figure :**

$\overline{AD} \parallel \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{M\}$,

E is the midpoint of $\overline{BC}$



Prove that : The area of the figure ABEM = the area of the figure DMEC

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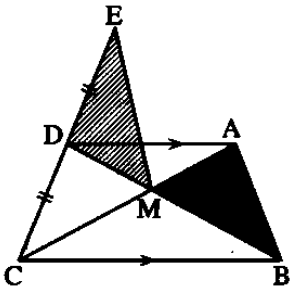
2. **In the opposite figure :**

$\overline{AD} \parallel \overline{BC}$ and $\overline{AC} \cap \overline{BD} = \{M\}$,

D is the midpoint of $\overline{EC}$

Prove that :

The area of Δ MDE = the area of Δ AMB



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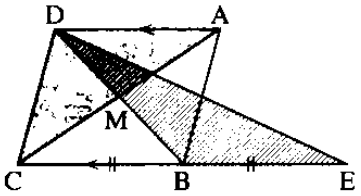
3. **In the opposite figure :**

ABCD is a parallelogram. Its diagonals intersect at M in which $\overline{AD}$ // $\overline{BC}$ and B is the midpoint of $\overline{EC}$



Prove that : The area of Δ EBD = the area of Δ ACD

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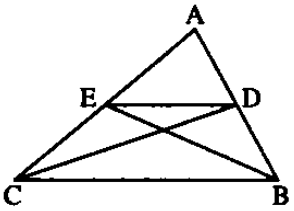
4. **In the opposite figure :**

ABC is a triangle in which D ∈ $\overline{AB}$ and E ∈ $\overline{AC}$ such that the area of Δ ABE = the area of Δ ACD



Prove that : $\overline{DE}$ // $\overline{BC}$

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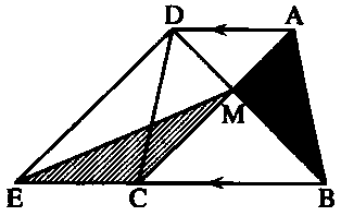
5. **In the opposite figure :**



ABCD is a quadrilateral in which $\overline{AD} // \overline{BC}$, $E \in \overrightarrow{BC}$ and $\overline{AC} \cap \overline{BD} = \{M\}$

The area of ΔABM = the area of ΔECM

Prove that : $\overline{DE} // \overleftrightarrow{AC}$

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Lesson (16)
Areas of some geometric figures

The area of the rhombus = L × h where L is the side length and h is the height.

The area of the rhombus = $\frac{1}{2}$ of the product of the lengths of its two diagonals.

If the two legs of the trapezium are equal in length, then it is called an isosceles trapezium.
The following are the properties of the isosceles trapezium :

The two base angles of the isosceles trapezium are equal in measure.

The two diagonals of the isosceles trapezium are equal in length.

The isosceles trapezium has only one axis of symmetry which is the perpendicular bisector of its bases.

The area of the trapezium = half of the sum of lengths of the two parallel bases × height

The area of the trapezium = the length of the middle base × height

Complete each of the following :

1. The area of rhombus whose perimeter is 20 cm. and height 4 cm. = ...
2. The length of the diagonal of a square of area 50 cm^2 equals ..... cm.
3. The length of side of a square whose area equals the area of a rectangle with dimensions 9 cm. , 16 cm. = ...
4. The length of the middle base of a trapezium whose area = 30 cm^2 and height 5 cm. equals .....

Homework

1. The area of the rhombus = the side length × ..... = $\frac{1}{2}$ of the product of .....
2. The area of the square = the square of the length of ..... = $\frac{1}{2}$ .....
3. The length of the middle base of the trapezium equals .....
4. The area of the trapezium = half of the sum of lengths of the two parallel bases × .....
   = the length of ..... × its height
5. The base angles of the isosceles trapezium are .....

6. The diagonals of an isosceles trapezium are .....

Choose the correct answer :

1. If the area of a square is 50 cm^2, then the length of its diagonal = ...

(a) 25 cm. (b) 5 cm. (c) 10 cm. (d) 20 cm.

2. If the perimeter of a rhombus is 24 cm. and its area = 30 $cm.^2$ then its height = ...

(a) 4 cm. (b) 5 cm. (c) 6 cm. (d) 12 cm.

3. If the product of the lengths of the diagonals of a rhombus = 96 cm^2 and its height is 6 cm., then its side length = ...

(a) 12 cm. (b) 8 cm. (c) 6 cm. (d) 4 cm.

4. If the area of a trapezium is 32 cm^2 and its height is 4 cm., then the length of its middle base = ...

(a) 4 cm. (b) 8 cm. (c) 14 cm. (d) 16 cm.

5. The trapezium in which the length of one of its parallel bases is 15 cm., and its area is 108 cm^2 and its height is 8 cm., then the length of the other base is .....

(a) 15 cm. (b) 4 cm. (c) 12 cm. (d) 27 cm.

6. The trapezium whose middle base length is x cm. and its height = $\frac{1}{2}$ the length of the middle base, its area = ... cm^2

(a) x^2 (b) $\frac{x^2}{2}$ (c) $\frac{x^2}{4}$ (d) $\frac{x^2}{8}$

Homework

1. The area of rhombus is 20 cm^2, the length of one of its diagonals is 5 cm., then the length of the other diagonal = ...

(a) 8 cm. (b) 4 cm. (c) 10 cm. (d) 15 cm.

2. The area of the square whose side length is 6 cm. ..... the area of the square whose diagonal length is 8 cm.

(a) > (b) < (c) = (d) ≡

3. The trapezium in which the lengths of its two parallel bases are 15 cm. and 11 cm. Its middle base is with length .....

(a) 26 cm. (b) 15 cm. (c) 13 cm. (d) 11 cm.

4. If the area of the trapezium is 450 cm^2, and the lengths of its two parallel bases are 24 cm. and 12 cm. , then its height = ...

(a) 12.5 cm. (b) 25 cm. (c) 36 cm. (d) 52 cm.

Find the area of the following figures:

1. A rhombus of side length 6 cm. and its height = 5 cm. « 30 cm^2 »

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2. A rhombus whose diagonal lengths are 24 cm. and 10 cm. « 120 cm^2 »

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3. A square whose diagonal length = 10 cm. « 50 cm^2 »

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4. A trapezium whose bases lengths are 8 cm. and 10 cm. and its height = 5 cm. « 45 cm^2 »

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5. A trapezium whose middle base length is 7 cm. and its height = 6 cm. « 42 cm^2 »

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Homework

1. A rhombus whose side length 12 cm. and its height = 8 cm. « 96 cm^2 »

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2. A rhombus whose diagonals lengths are 8 cm. and 10 cm. « 40 cm^2 »

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3. A square whose diagonal length = 8 cm. « 32 cm^2 »

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4. A trapezium whose bases lengths are 6 cm. and 8 cm. and its height = 12 cm. « 84 cm^2 »

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5. A trapezium whose middle base length is 12 cm. and its height = 8 cm. « 96 cm^2 »

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Essay problems:

1. A square whose area equals the area of the rectangle whose dimensions are 2 cm. and 9 cm. Find the length of its diagonal. « 6 cm. »

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2. 🕮 Two pieces of land have equal areas , one of them has the shape of a rhombus whose diagonals are 18 m. and 24 m. , and the other one has the shape of a trapezium whose height is 12 m. Find the length of its middle base. « 18 m. »

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3. 🕮 The area of a trapezium is 180 cm^2 and its height is 12 cm. Find the lengths of its parallel bases if the ratio between their lengths is 3 : 2 « 18 cm. , 12 cm. »

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Homework

1. Two land pieces are equal in area , the first is in the shape of a square and the second is in the shape of a rhombus whose diagonals lengths are 8 metres and 16 metres. Find the perimeter of the square-shaped piece. « 32 cm. »

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2. 🕮 Find the area of the rhombus whose perimeter is 52 cm. and the length of one of its diagonals is 10 cm. « 120 cm^2 »

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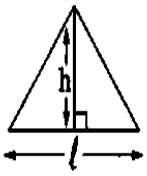
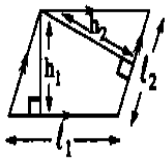
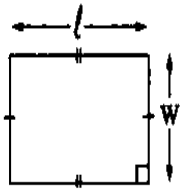
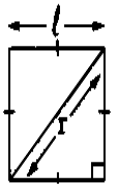
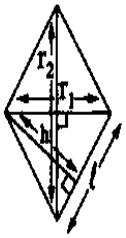
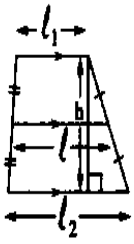
The figure		The perimeter	The area
The triangle		The sum of the lengths of its three sides	$\frac{1}{2}$ of the base length × height $= \frac{1}{2} l \times h$
The parallelogram		The sum of lengths of two adjacent sides × 2 $= 2(l_1 + l_2)$	The base length × height $= l_1 \times h_1 = l_2 \times h_2$
The rectangle		2 (Length + Width) $= 2(l + W)$	Length × Width $= l \times W$
The square		Side length × 4 $= 4l$	Square of side length $= l^2$ or $\frac{1}{2}$ of the square of its diagonal length $= \frac{1}{2} r^2$
The rhombus		Side length × 4 $= 4l$	Side length × height $= l \times h$ or $\frac{1}{2}$ the product of the lengths of the two diagonals $= \frac{1}{2} r_1 \times r_2$
The trapezium		The sum of lengths of its sides	$\frac{1}{2}$ the sum of lengths of the two parallel bases × height $= \frac{1}{2}(l_1 + l_2) \times h$ or the length of the middle base × height $= l \times h$

Date: ……/……/

Unit 1: Factroization

Lesson 6: Factroizing by grouping

Board Summary

1) $ax + bx + ay + by = x(a + b) + y(a + b) = (x + y)(a + b)$

2) **If** $a + b = 5, x + y = 7$

find using factorization the value of the expression $ax + bx + ay + by$

3) Factorize compeletly

$$x^2 + 4x + 4 - y^2$$

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Date: ……. /……. /…….

Evaluation

1- Complete

(a) $Lx + Ly + mx + my$ =…….( ) + ……. ( )

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(b) $a + b = 10$, $c + d = 3$ then the value of $ac + ad + bc + bd$ = ……

2- Factorize completely:

(1) $a^2 + ab + 2a + 2b$

(2) $x^3 - 3x^2 + 6x - 18$

(3) $xy + 5y + 7x + 35$

(4) $Lb + Lc - mb - mc$

(5) $x^2 - 10x + 25 - y^2$

(6) $x^2 - 6x + 9 - L^2$

(7) $x^5 - x^3 - x^2 + 1$

(8) $x^3 + x^2 + x + 1$

(9) $x^3 + 2xy + y^2 - 9$

Date: ……. /……. /…….

Homework

1- Complete

(a) $zx - zy + lx - ly = \ldots\ldots + \ldots\ldots$

(b)If $m + n = 10$, $d + e = 2$ then the value of $md + me + nd + ne = \ldots\ldots\ldots$

2- Factorize completely:

(1) $3ax + 3ay + 4bx + 4by$

(2) $x^2 - 10x + 25 - k^2$

(3) $x^2 - 3x^2 + 6x - 18$

(4) $a^3 + b^3 + 7a - 7b$

Remember

To factorize an experssion formed of 4 terms we divide the experessionsthen we take the H.C.F from each group.

Date: ……. /……. /…….

Unit 1: Factroization

Lesson 7: Factroizing by completing the square

Board Summary

Example: Factorize completely:

(1) x^4+4

(2) $81x^4+4y^4$

(3) x^4+9x^2+81

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Date: ……. /……. /…….

Evaluation

1- Complete

(a) $64x^4 + y^4 =$ ( )( )

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(b) $81b^4 + 4c^4$

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(c) $x^4 + 64$

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(d) $x^4 - 11x^2y^2 + y^4$

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(e) $x^4 + 9x^2 + 81$

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2- Factorize completely:

$x^2 - (x^2 + 9y^2) + 25y^4$

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Date: ……. /……. /…….

Homework

1- Complete

(a) $y^4 + 4 =$ ( )( )

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(b) $625l^4 + 4m^4 =$ ( )( )

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2- Factorize completely:

$x^4 + 64y^4$

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Lesson 8: Solving 2nd degree equation in one variable in R

Board Summary

$$If\ ab = 0\ then\ a = 0\ or\ b = 0$$

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Choose the correct answer:

(1) *The S.S of the equations* $x^2 + 25 = 0$ *in R is* ... ... ({0}, {-5}, {± 5 }, $\emptyset$)

(2) *The S.S of the equations* $\frac{9}{x} = \frac{x}{4}$ *in R is* ... ... ({6}, {-6},{6, -6}, {4, 9})

(3) *The S.S of the equations* $x^2 - 7x + 12 = 0$ *in R is* ... ...

({4} , {3,4} , {3} , $\emptyset$)

Date: …..... /……... /…....

Evaluation

1- <u>Complete:</u>

(a) $\boldsymbol{The\ S.S\ of\ the\ equation x^2 + 9 = 0\ in\ R\ is}$ … … … … … . . …

(b) $\boldsymbol{The\ S.S\ of\ the\ equation\ x^2 - x = 0\ in\ R\ is}$ … … … … … . . …

2- <u>Find the S.S in R:</u>

$(a) x^2 - 5x + 6 = 0$

$(b)\ x(x-5) - 14 = 0$

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3- A real number if we add it to its square the result will be 12 find this number?

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4- A positive real number its square exceeds its three times by 40 find this number?

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Date: ……. /……. /…….

5- Two real numbers one of them exceeds the other by 4 if the product of them is 45 find these two numbers?

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Homework

1- <u>Complete:</u>

(a) $The\ S.S\ of\ the\ equation x^2 - 3x - 10 = 0\ in\ R\ is$ ----------

(b) $The\ S.S\ of\ the\ equation x^2 + 15 = 8x\ in\ Q\ is$ ----------

(c) $If\ 9\ is\ a\ root\ of\ the\ equation\ x^2 - 7x + b = 0\ then\ b =$ ----------

2- <u>Find the S.S in R:</u>

$(a)\ x^2 - 14x + 45 = 0$

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$(b)\ x(x-2) = 8$

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$(c)\ x^3 - 5x^2 + 6x = 0$

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Date: …..... /..…... /…....

3- A rectangle its length is more than its width by 4 cm and its area is 21 cm^2.Find its two dimensions.

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4- A positive real number exceeds its multiplicative inverse by $\frac{6}{5}$ Find this number.

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5- If the age of Omar now is twice the age of Youssef and 2 years ago the difference between the squares of their ages was 15 years. Find the age of each of them now?

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Unit 4: Areas

Lesson 3 : Equality of areas of two triangles

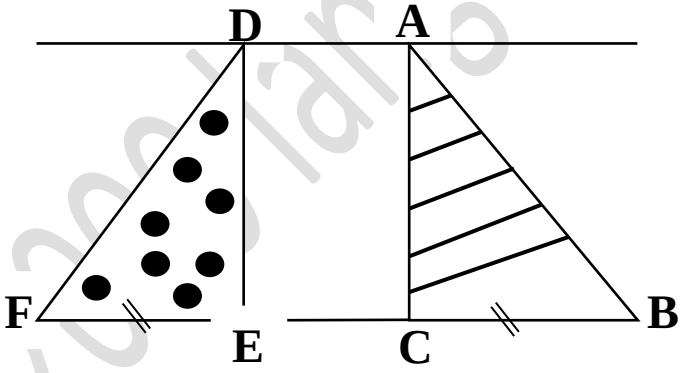
Board Summary

(1) Complete:

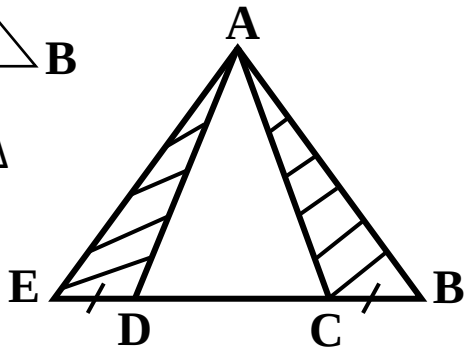
1)***Triangle with equal bases and lying between two parallel straight lines are***

2)***The median of a triangle divides its surface into two triangles equal in area***

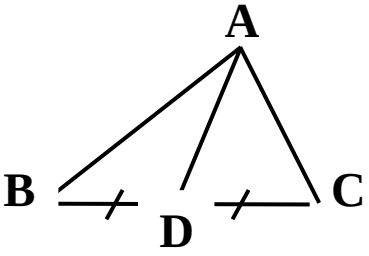
3)***If*** $\overleftrightarrow{AD} \parallel \overleftrightarrow{BF}$ ***,*** $BC = EF$ ***then area of*** ΔABC ***= area of*** Δ



4)***If*** $BC = DE$ ***then area of*** ΔABC ***= area of*** Δ



5) ***In*** ΔABC ***if*** $\overline{AD}$ ***is a median then area of*** ΔADC ***= area of*** Δ



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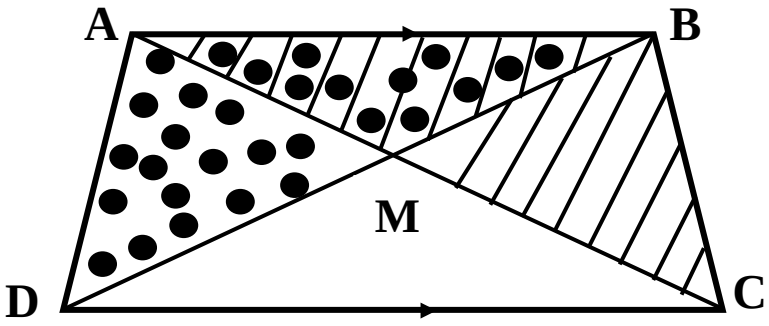
6) *If $\overline{AB} \parallel \overline{CD}$ then area of ΔACB = area of Δ* _____
***area of ΔCBD = area of Δ* _____**



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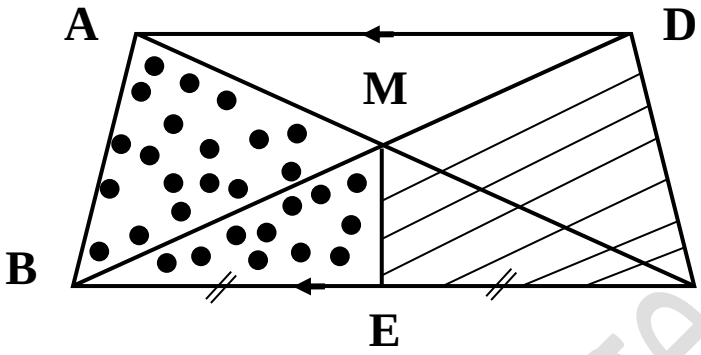
Date: ……. /……. /…….

Evaluation

1) $If\ ABCD\ is\ equadrilateral, \overline{AD} \parallel \overline{BC}, E\ is\ a\ mid\ point\ of\ \overline{BC}, \overline{AC} \cap \overline{BD} = \{M\}$
$Prove\ that$:
$area\ of\ the\ figure\ ABEM = area\ of\ the\ figure\ DCEM$



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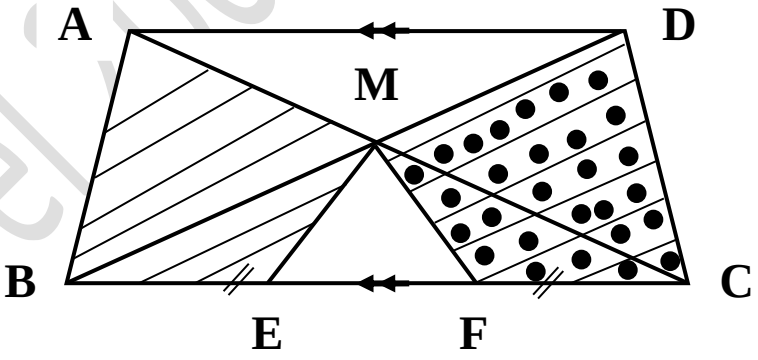
2) $In\ the\ opposite\ figure$
$\overline{AD} \parallel \overline{BC}, \overline{BC}, \overline{AC} \cap \overline{BD} = \{M\}, E, F \in \overline{BC}\ where\ EB = FC$
$Prove\ that$:
$area\ of\ the\ figure\ ABEM = area\ of\ the\ figure\ DCFM$



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Date: ……. /……. /…….

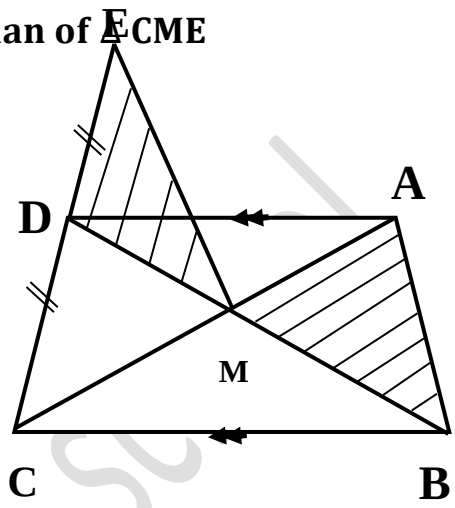
Homework

1) In the opposite figure

$\overline{AD} \parallel \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{M\}$, $\overline{MD}$ **is a median of** ΔCME

Prove that:

area of ΔAMB = **area of** ΔCME



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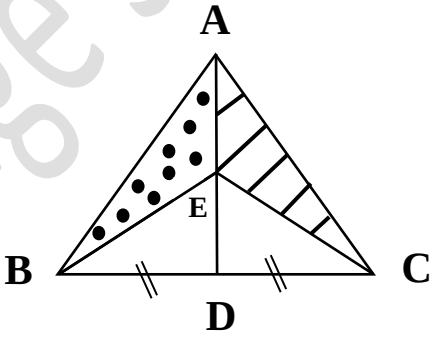
2) ***In the opposite figure***

$\overline{AD}$ ***is a median of*** ΔABC , $E \in \overline{AD}$

Prove that:

area of (ΔABE) = ***area of*** $\Delta(ACE)$



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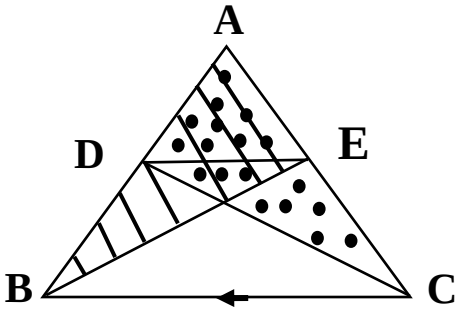
3) ***In the opposite figure***

$\overline{DE} \parallel \overline{BC}$

Prove that:

area of (ΔABE) = ***area of*** $\Delta(ACD)$



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Remember

*** The median of triangle divides its surface into two triangles equal in area.**
*** Two triangles which have the same base and lying between two parallel straight lines are equal in area.**
*** Two triangles with a common vertex and equal bases lie on the same straight line are equal in area.**

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Unit 4: Areas

Lesson 4 : Follow equality of areas of two triangles (the convers of the therom)

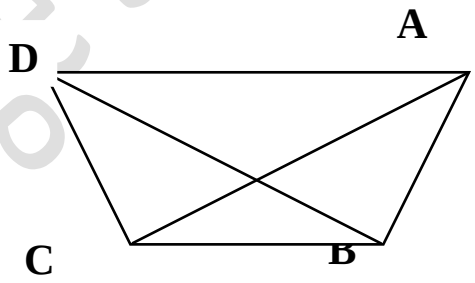
Board Summary

1)The two triangles which are equal in area and drawn on the same base *from one side of it then their vertices lie on a straight line parallel to this base*

2) ***In the opposite figure***

If area of $(\Delta\, ABD) =$ ***area of*** $\Delta(\, ACD\,)$ ***then***

… … ∥ … …



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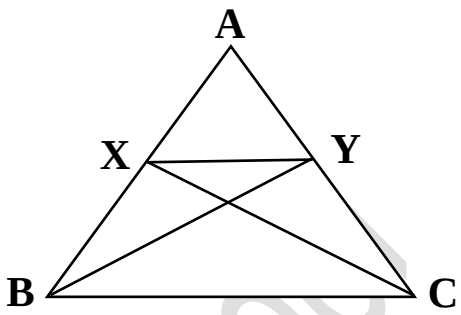
Evaluation

1) $If\ area\ \Delta\ AXC = area\ AYB\ ,\ \ Prove\ that: \overline{XY} \parallel \overline{BC}$



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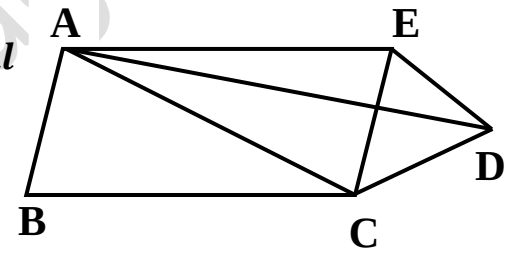
2) $In\ the\ opposite\ figure\ ABCD\ is\ a\ quadrilatural$
$area\ (\Delta\ ABC) = area\ \Delta(\ ADC\ ),$
$ABCE\ is\ a\ parallelogram\ Prove\ that: \overline{ED} \parallel \overline{AC}$



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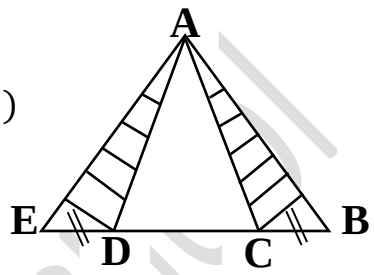
Homework

(1) Complete:

(1) ---------- *of a triangle divides its surface into two triangles equal in area.* (*Altitude , Median , side, otherwise*)

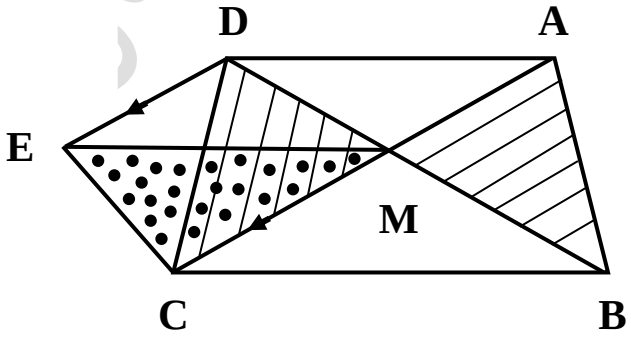
(2) *If* $BC = DE$ *then area* (ΔABC) ---------- *area* (ΔADE)
Where $D, C \in \overline{EB}$



(3) *The median of a triangle divides its surface into two triangles equal in* ----------
(*length – perimeter – area – volume*)

(4) *The two triangles which are equal in area and drawn on the same base from one side of it their vertices lie on a straight line* ---------- *this base*
(*parallel to – perpendicular to – equal to*)

(2) *If* $\overline{AC} \cap \overline{BD} = \{M\}$,
area ΔAMB = *area* ΔDMC
Prove that:
1) $\overline{AD} \parallel \overline{BC}$
2) *area* (ΔAMB) = *area* (ΔEMC)



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Unit 4: Areas

Lesson 5 : Areas of some geometric figures

Board Summary

Area of a rhombus = side length $\times$ ----------

Area of a rhombus = $\frac{1}{2}$ $of\ the\ product\ of$ ----------

$Area\ of\ a\ square =$ ----------

$Area\ of\ a\ square = \frac{1}{2}$ ----------

$Perimeter\ of\ rhombus =$ ----------

$Perimeter\ of\ a\ square =$ ----------

Area of a trapezium =

---------- $\times\ sum\ of\ the\ lengths\ of\ two\ parallel\ bases\ \times$ ----------

Area of a trapezium = $lenght\ of\ Middle\ base\ \times$ ----------

$The\ length\ of\ the\ Middle\ base =$ ……..

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Evaluation

(1) *Area of a rhombus whose diagonals lengths are* 8 *cm and* 6 *cm is* ---- cm^2

(2) *A square its diagonal length is* 10 *cm then its area* = ---- cm^2

(3) *The trapezium in which the lengths of the two parallel bases are* 3 *cm* , 7*cm and its height is* 5 *cm its area* = ------- cm^2

(4) *A square of area* 8 cm^2 *then its diagonal length* = ------- *cm*

(5) *A rhombus one of its diagonals lengths is* 6 *cm and its area is* 48cm^2 *then the length of the other diagonal* =------- *cm*

(6) *A rhombus of diagonal lengths* 6 *cm* , 8 *cm then its side length* =--- *cm*

Choose the correct answer

(1) *A rhombus of diagonal lengths* 10 *cm* , 6 *cm its area is* ------- cm^2

(60 , 30 , 16 , 120)

(2) *A trapezium, the length of its middle base is* 14 *cm and its height is* 5 *cm its area is* --------

(70 *cm* , 35 *cm* , 70 cm^2 , 35 cm^2)

(3) *A triangle its base length is* 5 *cm and its corresponding height is* 6 *cm its area is* ------- cm^2

(30 , 15 , 60 , 40)

(4) *A square of diagonal length* 8 *cm its area* = ---- cm^2

(64 , 16 , 32 , 24)

(5) *The ratio between the length of the diagonals of a rhombus is* 2: 3 *and the length of the smallest diagonal is* 6 *cm then its area* = ------- cm^2

(54 , 45 , 27 , 18)

(6) *A rhombus of diagonal lengths* 16 *cm* , 12 *cm its perimeter* = ------ *cm*

(20 , 10 , 40 , 28)

Date: ……. /……. /…….

Homework

(1) Complete:

(1) *A trapezium whose bases lengths are* 9 *cm and* 7 *cm then the length of its middle base* = ------- *cm*

(2) *A triangle its surface area is* 40 cm^2 *and the length of its base is* 8 *cm then its corresponding height* = -------*cm*

(3) *A rhombus of perimeter* 40 *cm and its height is* 8*cm then its area* = ------- cm^2

(4) *A rhombus of diagonals lengths* 2 *L cm and* 3*L cm then its area* = -------

(5) *A trapezium of bases lengths* 10 *cm and* 14 *cm and its area is* 84 cm^2 *then its height* = ---------*cm*

(6) *A triangle of area its diagonal length is* 13 *cm and its length is* 12 *cm its area* = --------- cm^2

(2) Choose the correct answer

(1) *A triangle of area* 30 cm^2 *and the length of its base is* 6 *cm then its corresponding height* = --------- *cm* (5 , 10 , 18 , 36)

(2) *A trapezium the lengths of its two parallel bases are* 5 *cm and* 7 *cm and its area is* 60 cm^2 *then its height* = --------- *cm* (5 , 12 , 10 , 72)

(3) *A square of area* 8 cm^2 *then its diagonal length* = ---------*cm*
(64 , 4 , 32 , 16)

(4) *A rhombus of area is* 42 cm^2 *and the length of one of its two diagonals is* 7 *cm , then the length of the other diagonal* = ------- *cm* (3 , 6 , 12 , 18)

(5) *A square of area* 36 cm^2 *then its perimeter is* ---------*cm*
(12 , 24 , 6 , 8)

(6) *The figure whose area* = $\frac{1}{2}$ *the square of its diagonal length is* ---------- (*rhombus , rectangle , square , triangle*)

(7) *A rectangle its length* = 4 *cm , its width is* 3 *cm then is diagonal length* = --------- *cm*
(7 , 12 , 5 , 6)

Date: ……. /……. /…….

Remember

$$\textbf{Area of a rhombus} = \frac{1}{2} \times d_1 \times d_2$$

$$\textbf{Area of a rhombus} = S \times h$$

$$\textbf{Area of a square} = S^2$$

$$\textbf{Area of a square} = \frac{1}{2}d^2$$

$$\textbf{Area of a trapezium} = \textbf{Middle base} \times h$$

$$\textbf{Area of a trapezium} = \frac{1}{2}(b_1 + b_2) \times h \quad or \left(\frac{b_1 + b_2}{2}\right) \times h$$

$$\textbf{Area of triangle} = \frac{1}{2} \times b \times h$$

$$\textbf{Area of a parallelogram} = b \times h$$